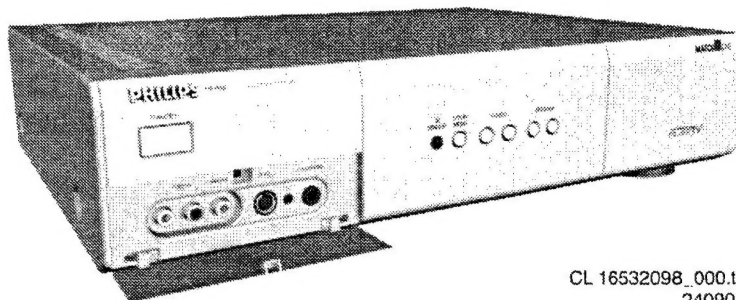


Service Service Service

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Service Manual

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PHILIPS

1. Technical Specifications, Connections, and Chassis Overview

1.1 Technical Specifications

1.1.1 Reception

Tuning system	: PLL
Colour systems	: PAL B/G, D/K, I
	: SECAM B/G, D/K
	: L/L1
Sound systems	: FM/AM-mono
	: FM/FM B/G, Czech
	: NICAM B/G, D/K, I, L
A/V connections	: PAL B/G, D/K, I
	: SECAM B/G, D/K,
	: L/L1
	: NTSC 4.43 (playback only)

Channel selections	: 125 channels
	: Full cable, UVSH
Aerial input	: 75 Ohm, IEC-type

1.1.2 Miscellaneous

Mains voltage	: 95 - 264 Vac
Mains frequency	: 50 - 60 Hz
Ambient temperature	: + 5 to + 45 deg. C
Maximum humidity	: 90% R.H.
Power ON dissipation	: 28 W typical
Power OFF dissipation	: 0.2 W typical
Standby Power dissipation	: 0.6 W Typical
Weight	: 4 kg
Dimensions (WxHxD)	: 435 x 100 x 330 mm

1.2 Connections

1.2.1 Front Connections

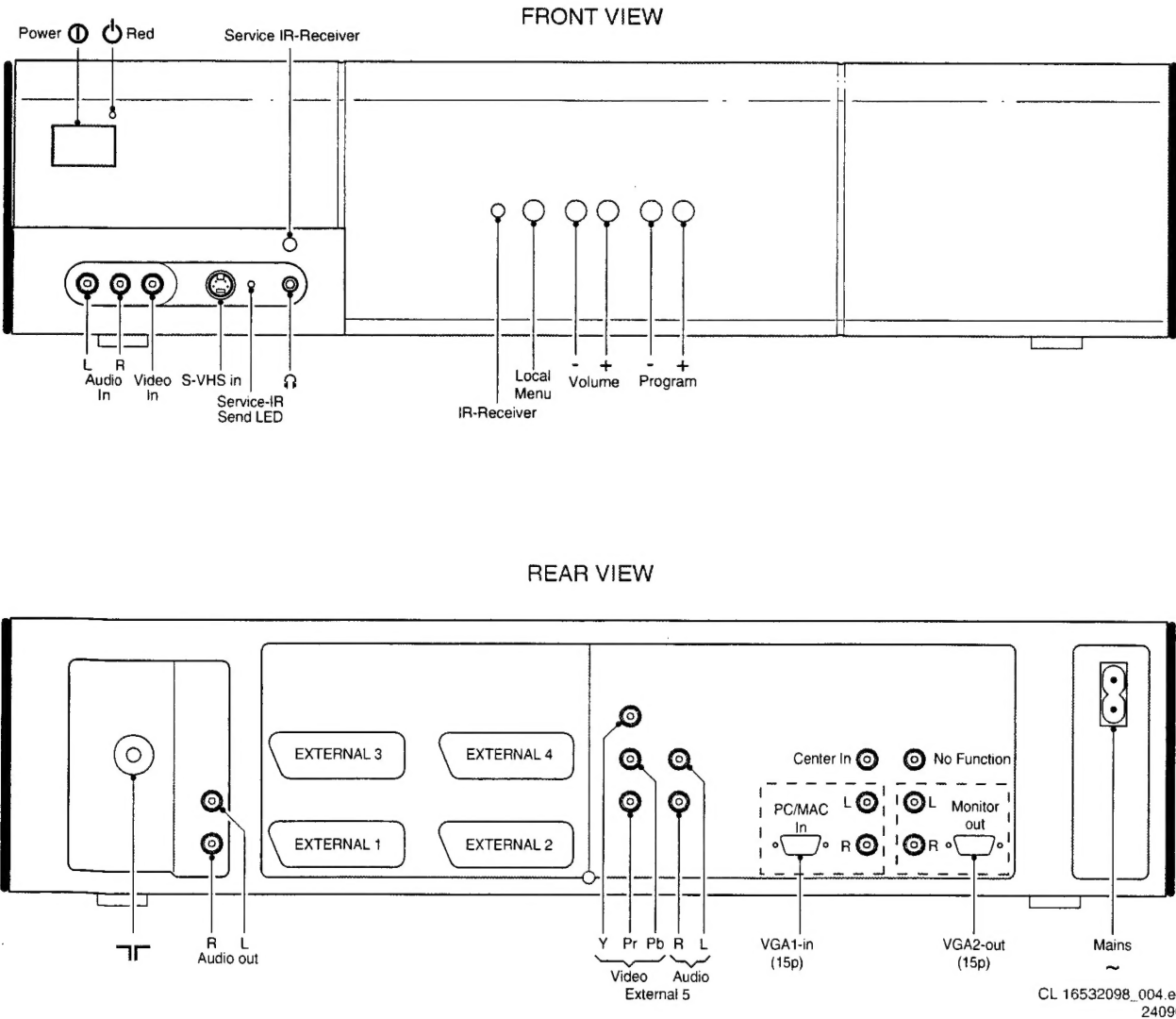
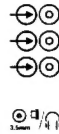


Figure 1-1 Front and rear connections

Audio/Video - In

1 - Audio L	2.5 V _{rms} /33 kOhm
2 - Audio R	2.5 V _{rms} /33 kOhm
3 - Video CVBS	1 V _{pp} /75 Ohm
4 - Headphone	100 mW/8 Ohm 15mW/2 kOhm



SVHS - In

1 - Y	Ground
2 - C	Ground
3 - Y	1 V _{pp} /75 Ohm
4 - C	0.3 V _{pp} /75 Ohm



1.2.2 Rear Connections

Aerial - In

1 - IEC-type	Coax, 75 Ohm
--------------	--------------



Audio - Out (Constant Level)

1 - Audio L	0.5 V _{rms} /10 kOhm
2 - Audio R	0.5 V _{rms} /10 kOhm



EXT1: SCART - In/Out (RGB, CVBS)

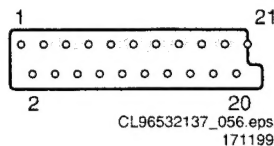
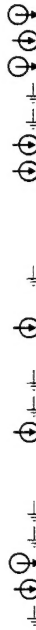


Figure 1-2 SCART connector

1 - Audio - R	0.5 V _{rms} /1 kOhm
2 - Audio - R	0.5 V _{rms} /10 kOhm
3 - Audio - L	0.5 V _{rms} /1 kOhm
4 - Audio	Ground
5 - Blue	Ground
6 - Audio - L	0.5 V _{rms} /10 kOhm
7 - Blue	0.7 V _{pp} /75 Ohm
8 - CVBS-status	0 - 1.3 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3
9 - Green	Ground
10 -	
11 - Green	0.7 V _{pp} /75 Ohm
12 -	
13 - Red	Ground
14 - RGB-status	Ground
15 - Red	0.7 V _{pp} /75 Ohm
16 - RGB-stat./FBL	0 - 0.4 V: INT 1 - 3 V: EXT/75 Ohm
17 - CVBS	Ground
18 - FBL	Ground
19 - CVBS	1 V _{pp} /75 Ohm
20 - CVBS	1 V _{pp} /75 Ohm
21 - Shielding	Ground



EXT2: SCART - In/Out for VCR (RGB, CVBS, SVHS)

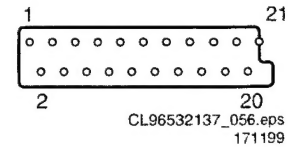


Figure 1-3 SCART connector

1 - Audio - R	0.5 V _{rms} /1 kOhm
2 - Audio - R	0.5 V _{rms} /10 kOhm
3 - Audio - L	0.5 V _{rms} /1 kOhm
4 - Audio	Ground
5 - Blue	Ground
6 - Audio - L	0.5 V _{rms} /10 kOhm
7 - Blue/C	0.7 V _{pp} /75 Ohm
8 - CVBS-status	0 - 1.3 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3
9 - Green	Ground
10 - Easy Link	(P50)
11 - Green	0.7 V _{pp} /75 Ohm
12 -	
13 - Red	Ground
14 - RGB-status	Ground
15 - Red/C	0.7 V _{pp} /75 Ohm
16 - RGB-stat./FBL	0 - 0.4 V: INT 1 - 3 V: EXT/75 Ohm
17 - CVBS	Ground
18 - FBL	Ground
19 - Y/CVBS	1 V _{pp} /75 Ohm
20 - Y/CVBS	1 V _{pp} /75 Ohm
21 - Shielding	Ground



EXT3: SCART - In (CVBS, Audio)

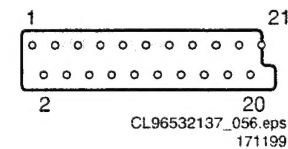


Figure 1-4 SCART connector

1 -	
2 - Audio - R	0.5 V _{rms} /10 kOhm
3 -	
4 - Audio	Ground
5 -	Ground
6 - Audio - L	0.5 V _{rms} /10 kOhm
7 -	
8 - CVBS-status	0 - 1.3 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3
9 -	Ground
10 -	
11 -	
12 -	
13 -	Ground
14 - Status	Ground
15 -	
16 -	
17 - CVBS	Ground
18 - CVBS	Ground
19 -	
20 - CVBS	1 V _{pp} /75 Ohm
21 - Shielding	Ground



EXT4: SCART- In (CVBS, Audio)

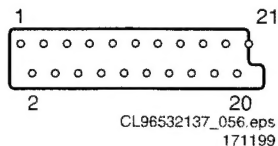


Figure 1-5 SCART connector

1 -		
2 - Audio - R	0.5 V _{rms} /10 kOhm	⊕
3 -		
4 - Audio	Ground	⊥
5 -	Ground	⊥
6 - Audio - L	0.5 V _{rms} /10 kOhm	⊕
7 -		
8 - CVBS-status	0 - 1.3 V: INT 4.5 - 7 V: EXT 16:9 9.5 - 12 V: EXT 4:3	
9 -	Ground	⊥
10 -		
11 -		
12 -		
13 -	Ground	⊥
14 - Status	Ground	⊥
15 -		
16 -		
17 - CVBS	Ground	⊥
18 - CVBS	Ground	⊥
19 -		
20 - CVBS	1 V _{pp} /75 Ohm	⊕
21 - Shielding	Ground	⊥

EXT5: SD - In (YPbPr, Audio)

- -Y	1 V _{pp} /75 Ohm	⊕
- -Pr	0.7 V _{pp} /75 Ohm	⊕
- -Pb	0.7 V _{pp} /75 Ohm	⊕
- -Audio - L	0.5 V _{rms} /1 kOhm	⊕
- -Audio - R	0.5 V _{rms} /1 kOhm	⊕

PC/MAC - In (Sub-D: RGB+H/V)

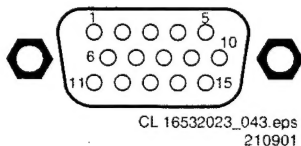


Figure 1-6 VGA connector

1 - Red	0.7 V _{pp} /75 Ohm	⊕
2 - Green	0.7 V _{pp} /75 Ohm	⊕
3 - Blue	0.7 V _{pp} /75 Ohm	⊕
4 - Data 2	n.c.	
5 - Test	Ground	⊥
6 - Red	Ground	⊥
7 - Green	Ground	⊥
8 - Blue	Ground	⊥
9 - n.c.		
10 -	Ground	⊥
11 - Data 0	n.c.	
12 - Data 1	n.c.	
13 - H-sync	0 - 5 V/1 kOhm	⊕
14 - V-sync	0 - 5 V/1 kOhm	⊕
15 - Data 3	n.c.	

Audio PC/MAC - In (Cinch: VGA1, Centre)

1 - Centre	0.5 V _{rms} /10 kOhm	⊕
2 - Audio L	0.5 V _{rms} /10 kOhm	⊕
3 - Audio R	0.5 V _{rms} /10 kOhm	⊕

Audio Monitor - Out (Cinch: VGA2, RC-in)

1 - RC - in	5 V	⊕
2 - Audio L	0.5 V _{rms} /10 kOhm	⊕
3 - Audio R	0.5 V _{rms} /10 kOhm	⊕

Monitor - Out (Sub-D: RGB+H/V, UART)

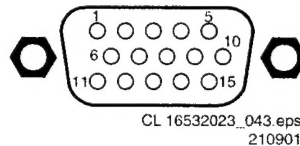
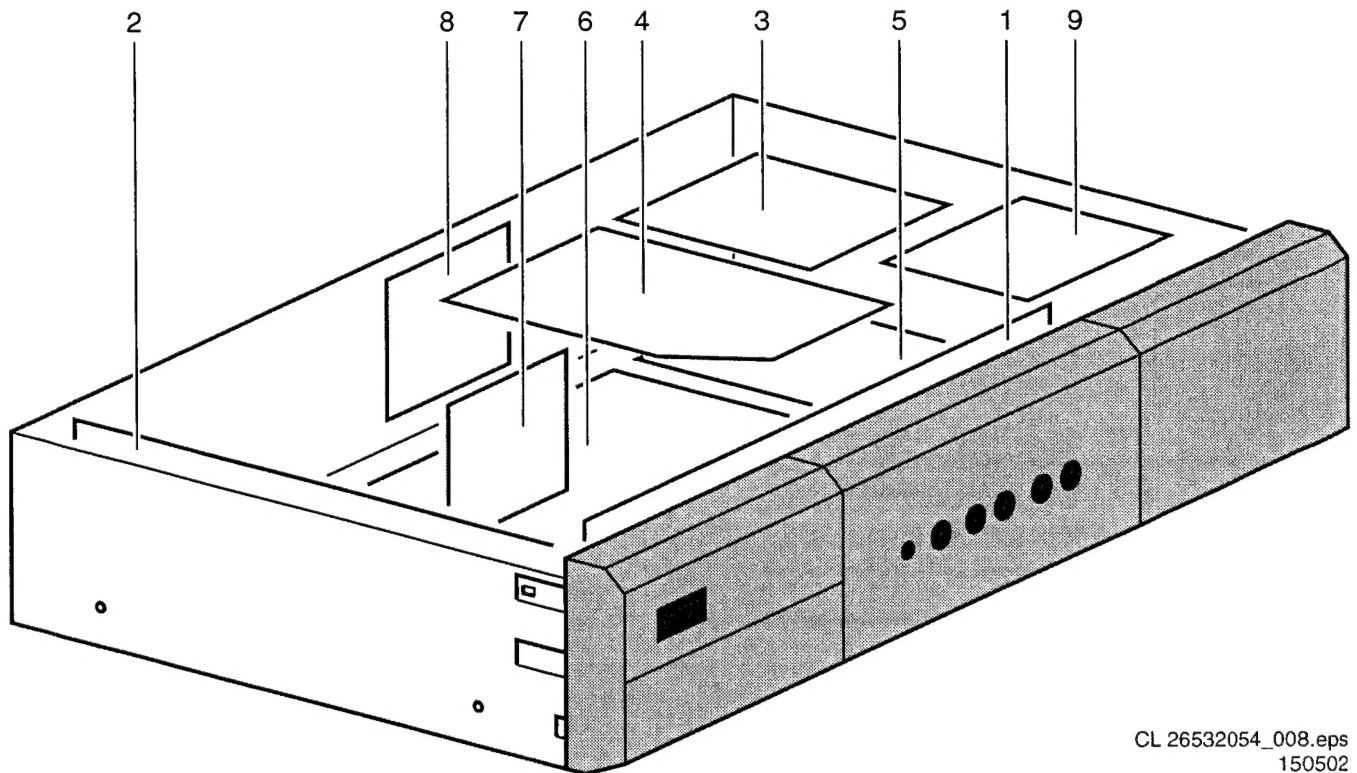


Figure 1-7 VGA connector

1 - Red	0.7 V _{pp} /75 Ohm	⊕
2 - Green	0.7 V _{pp} /75 Ohm	⊕
3 - Blue	0.7 V _{pp} /75 Ohm	⊕
4 - Data 2	n.c.	
5 - Test	Ground	⊥
6 - Red	Ground	⊥
7 - Green	Ground	⊥
8 - Blue	Ground	⊥
9 - RC		⊕
10 -	Ground	⊥
11 - Data 0	CONFIG_IDENT	⊕
12 - Data 1	UART - TXD	⊕
13 - H-sync		⊕
14 - V-sync		⊕
15 - Data 3	UART - RXD	⊕

1.3 Chassis Overview



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Figure 1-8 Panel position

1. Front I/O Panel (FP).
2. Power Supply Panel (PS).
3. Double Window Panel (if present).
4. Feature Box (FBX).
5. Small Signal Panel (SSP).
6. Audio Video Interface Panel (AVI).
7. Scaler Panel (if present).
8. Standard Definition Connector Panel (SD).
9. 3D Comb Panel (C)

2. Safety Instructions, Warnings, and Notes

2.1 Safety Instructions


Safety regulations require that **during** a repair:

- Connect the Receiver box to the mains via an isolation transformer.
- When you use the Receiver box in combination with a plasma monitor, do not operate the monitor without the front glass plate. One function of this glass plate is to absorb IR radiation. Without this glass plate, the level of radiation could damage your eyes.
- Safety components, indicated by the symbol , must be replaced with original components.





Safety regulations require that **after** a repair, you must return the set in its original condition. Pay particular attention to the following points:

- Route the wire trees in their original positions and fix them in place with the mounted cable clamps.
- Check the insulation of the mains lead for external damage.
- Check the electrical DC resistance between the mains plug and the secondary side (only for sets which have an mains isolated power supply):
 - Unplug the mains cord and connect a wire between the two pins of the mains plug;
 - Set the mains switch to the "on" position (keep the mains cord unplugged!);
 - Measure the resistance value between the pins of the mains plug and the metal shielding of the tuner or the aerial connection on the set. The reading should be between 4.5 MOhm and 12 MOhm.
 - Set the mains switch to the "off" position, and remove the wire between the two pins of the mains plug.
- Check the cabinet for defects, to prevent the customer from touching any inner parts of the television set.

2.2 Warnings

- All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD symbol ). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are connected with the same electrical potential as the set by a wristband with resistance. Keep components and tools at this same potential. Available ESD protection equipment:
 - Complete ESD3 kit (small tablemat, wristband, connection box, extension cable and earth cable): 4822 310 10671.
 - Wristband tester: 4822 344 13999.
- Be careful while taking measurements in the live voltage section.
- Never replace modules, or other components, with the television set "ON."
- Use plastic tools, instead of metal tools, when performing alignments on the television set. This will help prevent short circuits and reduce the danger of a circuit becoming unstable.

stereo sound (L: 3 kHz, R: 1 kHz unless stated otherwise) and picture carrier at 61.25 MHz (NTSC).

- Where necessary, measure the oscillograms and direct voltages with (symbol ) and without (symbol ) aerial signal. Measure the voltages in the power supply section both in normal operation (symbol ) and in standby (symbol ). These values are indicated by means of the appropriate symbols.
- The semiconductors indicated in the circuit diagram and in the parts lists, are interchangeable position with the semiconductors in the unit, irrespective of the type indication on these semiconductors.

2.3.2 Schematic Notes



- All resistor values are in ohms and the value multiplier is often used to indicate the decimal point location (e.g. 2K2 indicates 2.2 kOhm).
- Resistor values with no multiplier may be indicated with either an 'E' or an 'R' (e.g. 220E or 220R indicates 220 Ohm).
- All Capacitor values are expressed in Micro-Farads ($\mu = \times 10^{-6}$), Nano-Farads ($n = \times 10^{-9}$), or Pico-Farads ($p = \times 10^{-12}$).
- Capacitor values may also use the value multiplier as the decimal point indication (e.g. 2p2 indicates 2.2 pF).
- An 'asterisk' (*) indicates component usage varies. Refer to the diversity tables for the correct values.
- The correct component values are listed in the Electrical Replacement Parts List. Therefore, always check this list when there is any doubt.

2.3.3 Practical Service Precautions

- **It makes sense to avoid exposure to electrical shock.** While some sources are expected to have a possible dangerous impact, others of quite high potential are of limited current and are sometimes held in less regard.
- **Always respect voltages.** While some may not be dangerous in themselves, they can cause unexpected reactions - reactions that are best avoided. Before reaching into a powered TV set, it is best to test the high voltage insulation. It is easy to do, and is a good service precaution.
- **Before powering up the TV set with the rear cover off** (or on a test fixture), attach a clip lead to the CRT DAG ground and to a screwdriver blade that has a well insulated handle. After the TV is powered on and high voltage has developed, probe the anode lead with the blade, starting at the case of the High Voltage Transformer (flyback - IFT). Move the blade to within two inches of the connector of the CRT.
If there is an arc, you found it the easy way, without getting a shock!
 If there is an arc to the screwdriver blade, replace the part that is causing the problem: the High Voltage Transformer or the lead (if it is removable).

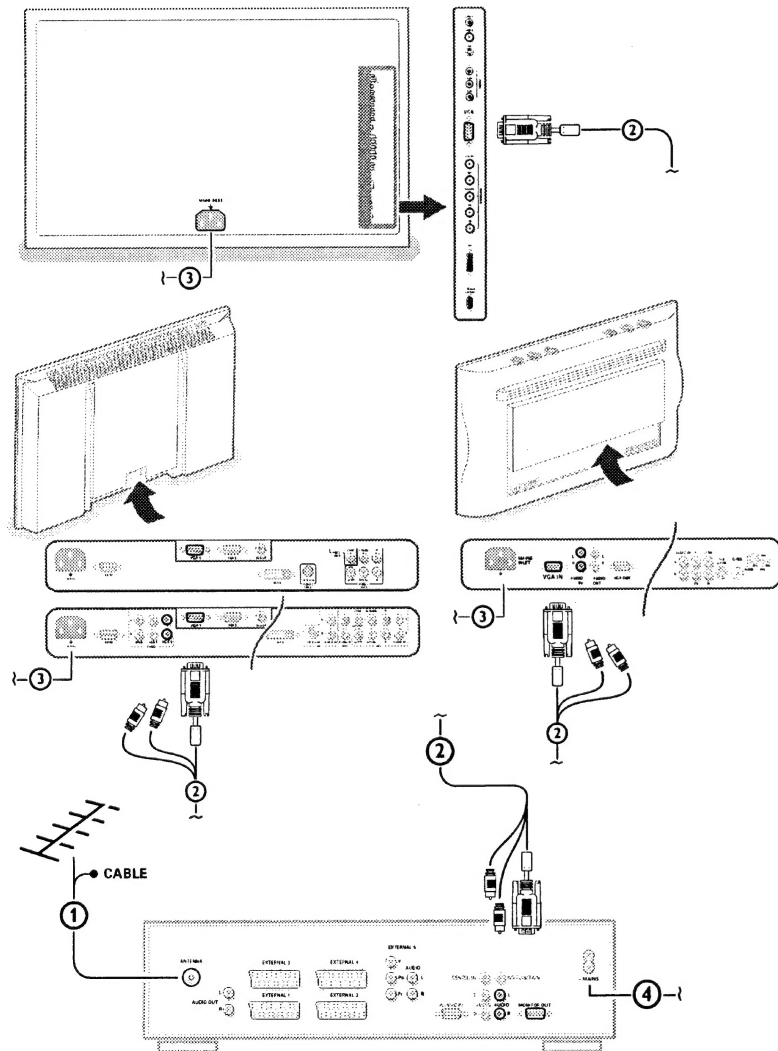
2.3 Notes

2.3.1 General

- Measure the direct voltages and oscillograms with regard to the chassis ground (symbol ) or hot ground (symbol )
- The direct voltages and oscillograms shown in the diagrams are indicative. Measure them in the Service Default Mode (see chapter 5) with a colour bar signal and

3. Directions for Use

Installation



Your remote control

Peripherals p. 27

Source selection of EXT1, EXT2, EXT3, EXT4, EXT5, FRONT, VGA or TV channels

Mode keys p. 10

TV, VCR, DVD, SAT, TAPE, CD, TUNER or CDR selection

Dual screen/PIP on/off p. 18

(FTR 9264 only)

Freeze format on/off p. 10

(FTR 9264 only)

Cinema Link

See separate instruction manual

Teletext Guide on/off p. 20

OK Activate your choice p. 10

Volume Up/Down p. 10

Sound mute p. 10

Programme selection p. 10

Screen information p. 10

PIP Smart surf key p. 11

Video recorder function p. 28

Surround mode p. 11

EasyLink - instant recording p. 11

Picture format p. 11

Switch to standby p. 10

Colour keys

- direct teletext page or subject selection p. 21
- basic functions selection in Teletext Guide p. 20

Audio- and Video equipment p. 28-29

Cursor to select your choice

Time display p. 11

Multipip on/off p. 19 (FTR 9264 only)

Enlarge in TXT p. 22

Zoom on/off p. 11

Swapping screens p. 18 (FTR 9264 only)

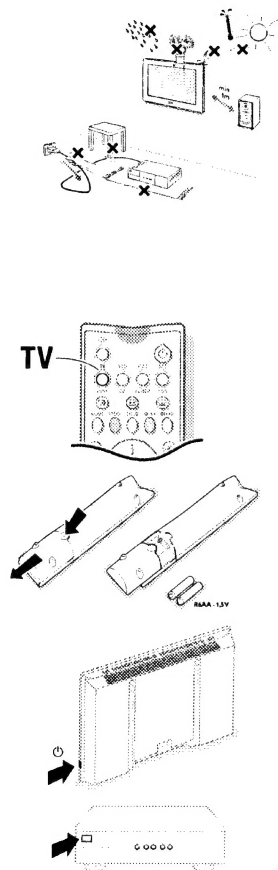
Smart Controls

Smart sound p. 12

Active control p. 12

Smart picture p. 12

Preparation



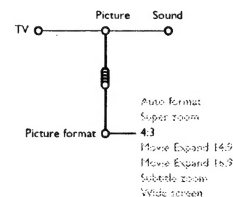
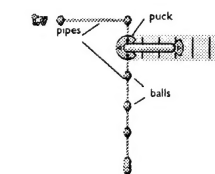
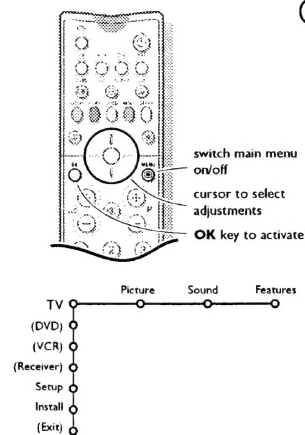
- Place the receiver box wherever you want, but make sure that air can circulate freely through the ventilation slots. Do not install the receiver box in a confined space such as a book case or a similar unit. To prevent any unsafe situations, no naked flame sources, such as lighted candles, should be placed on or in the vicinity. Avoid heat, direct sunlight and exposure to rain or water. The equipment shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on it.
- Connect the supplied aerial cable ① and the VGA cable with trailing audio cinch connectors ② as shown in the inside frontcover of this handbook. Make sure all screws of the cable ② are tightened well.

TV receiver box with speakerless monitor

In case you connect your TV receiver box with a speakerless monitor, and without having connected an audio receiver, all references made in this instruction book to sound reproduction, volume control, and audio connections, are not applicable (except for a headphone connection). The keys on the remote control referring to sound have no function either.

- To connect your computer, see the separate supplied instruction manual with your monitor. To connect other peripherals, see p. 24. If you dispose of a Cinema Link combination (Cinema Link Audio receiver and/or Cinema Link video recorder and/or DVD player), see the separate supplied instruction manual. In order to obtain the best result, please use only the supplied antenna cables between the receiver box and videorecorder, and between videorecorder and antenna connector.
- Insert the mains cord supplied ③ into the **MAINS** at the back of the monitor and the mains cord ④ at the back of the receiver. Put both in the wall sockets.
- Remote control. Remove the cover of the battery compartment. Insert the 2 batteries supplied (Type R6AA-1.5V). Press the **TV** key to be sure your remote control is in the TV mode. The batteries supplied do not contain the heavy metals mercury and cadmium. Nevertheless in many countries batteries may not be disposed of with your household waste. Please check on how to dispose of batteries according to local regulations.
- Switch the TV on:** Press the power key ① at the right side of the monitor and the one on the front of the receiver box. A green indicator lights up both on the monitor and on the receiver box and the screen comes on. If the indicator is red, press the **-P+** key or one of the digit keys on the remote control.

The green indicator blinks every time you press a key on the remote control. When you switch on your set for the first time, the menu **LANGUAGE** automatically appears on the screen. The explanation appears in different languages one at a time. Follow the instructions on screen.



To use the menus and the menu system

Attention: point the remote control to the indicator of the monitor.

- Press the **MENU** key on the remote control to summon the main menu. Which items appear in the main menu depends on the peripherals connected. In case of an EasyLink VCR the menu item **VCR** is present, see p. 24. In case of a Cinema Link audio receiver the menu item **Receiver** is present. See the separate Cinema Link booklet supplied.
Note: The Main menu contains the item **Exit** to dismiss the menu, only when you switch on your TV for the first time, or when the Main menu is summoned with the **MENU** key in front of the TV receiver.
- Use the cursor in the up/down direction to select the **TV**, **(DVD)**, **(VCR)**, **(Receiver)**, **Setup** or **Install** menu.
Note: Sometimes not all the menu items are visible on the screen. Press the cursor down to reveal all items.
- Use the cursor in the left/right direction to select the menu item.
- Use the cursor up/down again to select the control you want to select or to adjust. For instance, see Picture menu.
- Press the **MENU** key again to turn off the main menu.

The menu system

Pipes, balls and a puck

The hierarchy of menus and controls is represented by an animated visual mechanism of pipes, balls and a puck. The animated mechanism constantly shows the current whereabouts and continually expands the view of the immediate neighbourhood.

The puck surrounds the ball indicating the user's current position in the menu hierarchy.

The puck is always present when the menu system is displayed.

The puck is divided into 4 parts. They correspond to the directional controls (up/down, left/right) on the remote control. The arrows on the cursor indicate which directions to choose.

In this way users can navigate through the menu hierarchy to the control they wish to adjust.

When items are more numerous than can fit comfortably on the TV display, only a portion are shown. Those omitted are indicated by a cluster of balls which indicates that there are 'more' items.

Direct selection and control

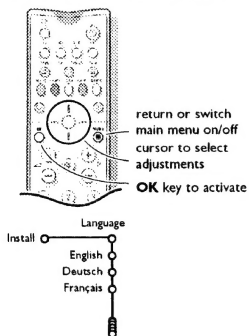
Menu items are controlled as soon as they are selected by the puck. Only a few items require confirmation with the **OK** key.

List controls

A list control is used to select one or more items from a list of options. For instance, the Picture format option list with 4:3, Movie Expand 14:9, etc. Press the right key to move the puck into the list. At least one item is the current value and is highlighted.

Moving the puck up or down with the up/down key causes the list to move down or up.

Select the menu language

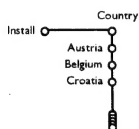


- 1 Press the **MENU** key on the remote control.

When you switch on your TV for the first time and no channels are stored so far, the menu Language automatically appears on the screen. This menu also has an additional item **Exit** with which the menu can be dismissed. The explanation appears in different languages, one at a time. Choose your preferred language and press the **OK** key on the remote control. Proceed with the Install menu.

- 2 Use the cursor down to select **Install**.
- 3 Use the cursor right to select **Language**. Follow the instructions on screen.
- 4 Use the cursor up/down to select your preferred language and press the **OK** key to confirm your selection.
- 5 Proceed with the **Install** menu.

Select the country



- 1 Use the cursor right to select **Country**.
- 2 Select the country where you are now located and press the **OK** key. Select **Other** when none of the countries applies.
- 3 Proceed with the **Install** menu.

Store TV channels



Automatic installation

- 1 Select **Automatic installation** in the **Install** menu.
Note: All channels must be unlocked in order to autoprogram. If requested, enter your code to unlock all channels. (See TV Features menu, Childlock, p. 16.)
- 2 Press the cursor down.
The autoprogramming option label **Start** appears.
- 3 Press the cursor right.
- 4 The message **Searching** appears and the progress of autoprogramming is displayed.
When the Automatic installation is complete, the puck navigates to **Install** again.

You can now search for and store the TV channels in two different ways: using **Automatic Installation** or **Manual Installation** (tuning-in channel by channel).

Select your choice with the cursor right.

After the new or extra TV channels have been stored, the TV automatically transfers those TV channels to the video recorder if it is equipped with the **EasyLink** function. The message **EasyLink: downloading** appears on the screen. The programme list of the video recorder is now the same as the one of the TV.

If a cable system or a TV channel which broadcasts **ACI** (Automatic Channel Installation) is detected, the search is stopped and the programme list appears.
Without **ACI** broadcast, the channels are numbered according your language and country selection. You can use **Reshuffle** to renumber them. See p. 6.

It is possible that the cable company or the TV channel displays a broadcast selection menu. Layout and items are defined by the cable company or the TV channel. Make your choice with the cursor and press the **OK** key.

Manual installation



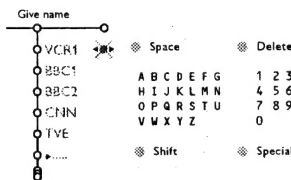
Searching for and storing TV channels is done channel by channel. You **must go through every step** of the **Manual Installation** menu.

- 1 Select **Manual Installation** in the **Install** menu.
- 2 Press the cursor down.
Follow the instructions on screen.

Note: Search or direct selection of a TV channel
If you know the frequency, the C- or S-channel number, enter the 3 digits of the frequency directly with the digit keys 0 to 9 (e.g. 0445). Press the cursor down to proceed.

Repeat to search for another TV channel.

Give name



It is possible to change the name stored in the memory or to assign a name to a TV channel for which a name has not yet been entered. A name with up to 5 letters or numbers can be given to the programme numbers 0 to 99. For example **SUPER**, **BBC1**,... Before programme number 0 you can also enter a name for the peripherals that are connected to a euroconnector.

Note: it is not possible to rename the VGA source.

- 1 Select **Give Name** in the **Install** menu and press the cursor down.

- 2 Select the programme number.
Note: keep the cursor up/down pressed to scroll through the programme list and to avoid that the TV tunes to each channel passed by

- 3 Press the cursor right.
A keyboard appears on the screen.
Press the cursor right to enter the keyboard.
Press the cursor up/down, left/right to select the first character and press **OK**. Repeat for every character you want to enter.
Select **Space** to enter a space; **Delete** to erase the highlighted character in the name entered; **Shift** to display upper- or undercast characters on the keyboard; **Special** to display special characters on the keyboard. Press **OK** to confirm.

- 4 Press the cursor left repeatedly when you have finished the name giving of the selected channel or peripheral.

- 5 Select another programme number and repeat steps 3 to 4.

Reshuffle the programme list

According to your preference you can change the order of the stored TV channels.

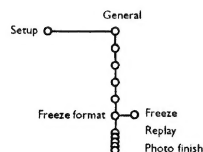
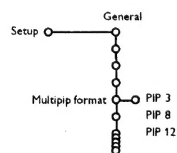
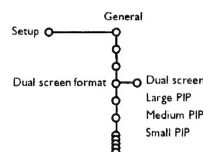
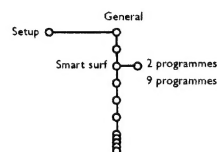
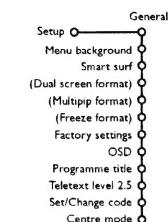
- 1 Select **Reshuffle** in the **INSTALLATION** menu.
- 2 Follow the instructions on screen.

Select Favourite TV channels

A VGA source always belongs to the list of Favourite programmes.

- 1 Select **Favourite programmes** in the **Install** menu.
- 2 Select your programme number with the cursor up/down.
- 3 Select **Yes** or **No** with the cursor right.
- 4 Repeat 2 and 3 for every TV channel or external you want to make a favourite or a non-favourite TV channel or external.

Select TV setup



The Setup menu allows you to adjust initial settings, i.e. those which are not related to the installation of the TV channels. The Setup menu contains items that control the settings of the TV's functions, features, services and peripherals you may have connected.

General

This menu allows you to change various settings that are presumably adjusted less frequently than most other settings.

Menu Background

- 1 Select **Menu Background** with the cursor down.
- 2 Press the cursor right.
- 3 Select **On** or **Off** to turn the Menu Background on or off.

Smart surf

- 1 Select **Smart surf** with the cursor down.
- 2 Select **2 programmes** or **9 programmes** with the cursor right.

Select **2 programmes** if you want the **P/P** key to toggle between the current and the previously selected channel.
Select **9 programmes** if you want the **P/P** key to summon a list of up to 9 channels which can be selected. (See Use of the Remote Control, p. 11.)

Dual screen format (FTR 9964 only)

This menu allows you to select the preferred format which can then be displayed toggling the **[FTR]** key on and off.

See Dual screen/PIP, p. 18.

Select **Dual screen**, **Large PIP**, **Medium PIP** or **Small PIP** with the cursor down.

When Dual screen mode is activated with the remote control **[FTR]** key, and when:

- **Dual screen** is selected, the TV splits the screen into two equally sized screens.
- **PIP** is selected, the TV shows a full screen of video with a pip window of video on top of it.

Multipip format (FTR 9964 only)

This menu allows you to select the preferred format which can then be displayed toggling the **[FTR]** key on and off.

Select **PIP3**, **PIP8** or **PIP12** with the cursor down.

See Multipip, p. 19 how to operate.

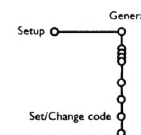
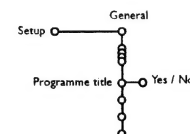
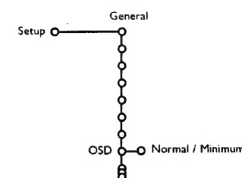
Freeze format (FTR 9964 only)

This function is not possible with a VGA source.

Freeze format allows you to select among three options: Freeze, Replay, Photo finish, to be activated when you press the **[FTR]** key on the remote control.

See p. 10.

*Note: Continuing to hold the **[FTR]** key down will also cycle the TV through the various formats. Changing the format this way does not store the selected format.*



Factory settings

This function allows you to reset most of the picture and sound settings to their predefined factory values.

- 1 Select **Factory settings** with the cursor down.
- 2 Press **OK** to erase settings and reset them to their default values.

OSD (On Screen Display)

- 1 Select **OSD** with the cursor down.
- 2 Press the cursor right to select **Normal** or **Minimum**.
Normal to activate extended display of TV channel and programme information on screen.
Minimum to activate the display of reduced channel information. See Use of the Remote Control, p. 10, **[FTR]** On screen information.

Note: When Subtitles is switched on, see Features, p. 16, display of the programme number is not possible.

Programme title

- 1 Select **Programme title** with the cursor down.
- 2 Press the cursor right to select **Programme title Yes** or **No**.
When selected **Yes**, after the selection of a TV programme or after pressing the **[FTR]** key on the remote control, a TV channel which broadcasts teletext may transmit the name of the TV channel or the programme title. When selected **No**, the programme title will only appear after pressing the **[FTR]** key, and not after the selection of a TV channel.

Set/Change code

The Child lock feature (see TV Features, p. 16) allows you to lock channels to prevent children from watching certain programmes.

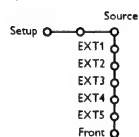
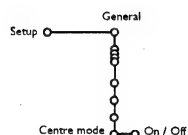
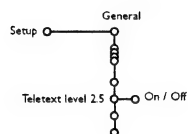
To watch locked channels, you need to enter an access code.

The Set/Change code menu item allows you to create or change a Personal Identification Number (PIN).

- 1 Select **Set/Change code** with the cursor down.
- 2 If no code exists yet, the menu item is set to **Set code**. Follow the instructions on screen.
If a code has previously been entered, the menu item is set to **Change code**. Follow the instructions on screen.
All number combinations from 0000 to 9999 are valid numbers.
- 3 The General menu reappears with a message confirming that the code has been created.

Important: You have forgotten your code !

- 1 Select **Set/Change code** in the General menu.
- 2 Press **OK**.
- 3 Press the cursor right.
- 4 Enter the overriding code 8-8-8-8.
- 5 Press the cursor again and enter a new personal 4-digit code.
The previous code is erased and the new code is stored.



Teletext level 2.5

Some broadcasters offer the opportunity to see more colours, other background colours and nicer pictures in the teletext pages.

- 1 Select **Teletext level 2.5** with the cursor down.
- 2 Press the cursor right to select **Teletext level 2.5 On** to take advantage of this feature.
- 3 Press the cursor right again to select **Teletext level 2.5 Off** if you like the more neutral teletext layout.
The selection made is valid for all channels which broadcast teletext.

Note: It may take a few seconds before teletext broadcast switches over to Teletext level 2.5.

Centre mode

When you have connected a multi channel audio receiver to the receiver box (see Connect peripheral equipment, p. 26) and you have selected **Centre mode On**, the loudspeakers of the monitor will act as centre speaker, making a separate centre speaker unnecessary.

Source

This menu allows you to select the peripheral you connected to one of the external inputs.

- 1 Select **Source** with the cursor right.
 - 2 Press the cursor down to select one of the external inputs.
 - 3 Press the cursor right to enter the list of types of peripherals attached to the selected input.
 - 4 Select the peripheral device with the cursor up/down.
- Once you have selected the source, e.g. VCR, this source will automatically be selected when your remote control is in VCR mode, see p. 10, and you press the **Q+** key on the remote control.

Decoder

If a decoder or a descrambler is connected, see p. 24, you can define one or more programme numbers as decoder programme numbers.

- 1 Select **Decoder** with the cursor right.
- 2 Select **Programme** with the cursor down.
- 3 Select the programme number under which you have stored the programme coming from your decoder.
- 4 Select **Status**.
 - Select the input used to connect your decoder: **None**, **EXT1**, **EXT2**.
 - Select **None** if you do not want the selected programme number being activated as a decoder programme number.

Operation

Use of the remote control

Q+ Select your computer or other peripherals

Press this key repeatedly to select **EXT1**, **EXT2**, **EXT3**, **EXT4**, **EXT5**, **FRONT**, **VGA** or **TV** channels, according to where you connected your peripherals (see p. 27).

Remark: In VGA mode only some keys are valid. See VGA menu, p. 27. Menus and on screen information will disappear if you select VGA.

TV VCR DVD SAT TAPE CD TUNER CDR

Press one of these keys to use the remote control directly in the TV, video recorder, DVD or satellite mode. A green indicator lights up. Press the same key again within 3 seconds to use the remote control in the mode indicated below the key (tape, CD, tuner or CD-recordable). A red indicator lights up. Press the key again within 3 seconds to return to the function named above the key.

Teletext Guide on/off see p. 20

OK Press this key to activate your choice, when in the menus.

Volume

Press **+** or **-** to adjust the volume.

Sound Mute

Temporarily interrupt the sound or restore it.

P Programme selection

To browse through the TV channels and sources stored.

Only those channels which are in the favourite list can be selected with the **-P+** keys. See p. 6.

0/9 Digit keys

To select a TV channel.

For a two digit channel number, enter the second digit within 2 seconds.

To switch immediately to a selected one digit TV channel, keep the digit key pressed a bit longer.

Screen information

Press to display information about the selected TV channel and programme.

Standby

The set is switched off and the red indicator lights up.

To switch the TV on again, press **- P +** or the digit keys.

If your EasyLink video recorder has the system standby function and you press the standby key for 3 seconds, both the TV and video recorder are switched to standby.

Dual screen/PIP on/off (FTR 9964 only)

See Setup, General menu, p. 7, and Dual screen/PIP, p. 18.

Freeze

Press the **Freeze** key to activate/de-activate a frozen picture.

Freeze format on/off (FTR 9964 only)

This function is not available with a VGA source.

See Setup menu, General, Freeze format, p. 8 where you can select among three modes to be displayed when the freeze key is pressed on the remote control: Freeze, Replay, Photo finish.

When the mode is **Freeze**: press the **Freeze** key to activate/de-activate a frozen picture. The audio continues to play.

When the mode is **Replay**: press the **Freeze** key to redisplay a few seconds of stored video in a PIP window. Press the **OK** key to display a few seconds of a new stored video picture. Press the **Freeze** key again to switch off.

When the mode is **Photo finish**: press the **Freeze** key to display 12 PIP windows of stored video pictures. Press the **OK** key to display a new series of frozen pictures. Press the **Freeze** key again to switch off.

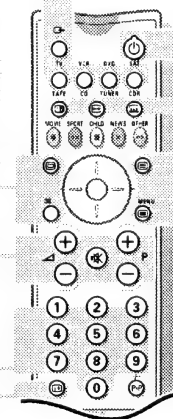
*Note: Continuing to hold the **Freeze** key down will cycle the TV through the various modes (Freeze, Replay, Photo finish).*

Cinema Go

See separate Cinema Link instruction manual supplied.

Teletext on/off see p. 21

Main menu on/off see p. 4



Surround mode on/off

- In **MONO** sound mode, this feature, when switched on, enables you to hear a special effect of sound.
- In **STEREO** sound mode, when Surround mode is switched on, it seems as though the loudspeakers are spread further apart from one another.

Instant record

If your video recorder has the EasyLink function, the **INSTANT** key for record can be operated in the TV mode.

Picture format

Press this key to summon a list of available picture formats.

Press this key repeatedly or press the cursor up/down to select another picture format: Auto format, Super zoom, 4:3, Movie Expand 14:9, Movie Expand 16:9, Subtitle zoom, Wide screen.

Auto format makes the picture fill the screen as much as possible.

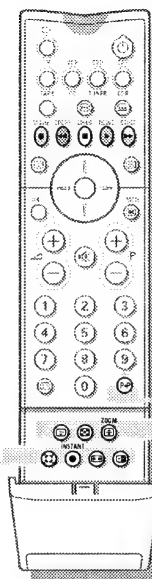
In case of subtitles in the bottom black bar, Auto format makes the subtitles visible. In case of a broadcaster logo in the corner of the top black bar, the logo disappears from the screen.

Super zoom removes the black bars on the sides of 4:3 programs with minimal distortion. When in Movie Expand 14:9, 16:9 or Super zoom picture format, you can make subtitles visible with the cursor up/down.

Note: In VGA mode press the key to switch between a 4:3 or a Wide screen picture format. In Dual screen mode press the key to switch between a full or a 4:3 letterbox picture format.

Swapping screens in Dual screen or PIP (FTR 9964 only)

See Setup, General menu, p. 8 and Dual screen/PIP p. 18.



PiP Smart surf

With this feature you can easily switch between different TV channels/sources that currently interest you.

In the menu system, you can set Smart surf to 2- or 9-programme.

(See General, Smart surf, p. 7.)

Press this key to select the previously viewed TV channel or source in case of a 2 programme surf, or to select the surf ring in case of a 9 programme surf.

In case of a 9 programme surf, a list appears at the right side of the screen. On top, the most recently added. The puck is on the channel number currently viewed.

Press the PiP key to turn to the next channel in the list or press cursor up/down to immediately select the desired TV channel of the list.

To add a new channel or source: tune to the channel or source you wish to add.

Press the PiP key. Press the cursor right to add.

If there are already nine channels/sources in the list, the one at the bottom of the list will be removed.

To remove a channel or source: select the channel number you want to remove. Press the PiP key. Press the cursor right to remove.

Press the OK key or wait for the time out to dismiss the Smart surf display.

Time display on/off

The time is displayed on the screen.

Multipip (FTR 9964 only)

Press to turn on/off Multipip.

The Multipip format that launches on the key press is determined by the selection you made in the Multipip format list in the General menu, see Setup, General, p. 8 and Multipip format, p. 19.

Note: Continuing to hold the key down will cycle the TV through the various formats (PIP3, PIPR, PIP12). Launching a new format after each second the key is held down. Changing the format this way does not store the selected format.

Press the key again to return to a full main screen picture.

ZOOM on/off

Press the ZOOM key to activate/deactivate the zoom function.

Press the OK key repeatedly to select one of the zoom magnifications (x1, x4, x9, x16). Use the cursor up/down, left/right to shift the selected zoom window over the screen with the cursor.

The zoom window is reset after: selecting another TV channel, another picture format or when another picture format is selected automatically. Zooming is disabled in Dual screen and VGA mode.

Active Control

Active Control is a pro-active and automatic system. The TV continuously measures and corrects all incoming signals in order to provide the best picture possible.

According to the monitor connected (with or without an Ambient Light Sensor which measures the light conditions of the room), the Active Control functionality may differ.

With a monitor without a light sensor: Press the key to select the the Active Control values Off or On.

With a monitor with a light sensor: Press the key repeatedly to select the Active Control values Off, Minimum, Medium or Maximum (recommended).

Minimum/On: Sharpness, Dynamic Contrast and Noise Reduction are controlled automatically.

Medium: Sharpness, Colour, Dynamic Contrast and Noise Reduction are controlled automatically.

Maximum: Sharpness, Colour, Contrast, Dynamic Contrast and Noise Reduction are controlled automatically.

Press the cursor in the right direction to select INFO.

The Active Control Demo appears.

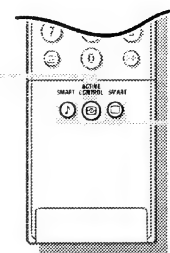
The picture settings are being adapted continuously and automatically.

The sliders will be moving, showing how the TV is tweaking the current picture.

None of the sliders is user controllable.

Press the OK key to switch off the Demo.

Note: Active Control is not available for digital HD signals.



Smart keys

To select predefined picture and sound settings.

Note: The Smart keys are disabled when a VGA source is being displayed.

Sound

Each time it is pressed, a different sound setting is selected, corresponding with specific factory setting of bass and treble.

Picture

Each time it is pressed, a different picture setting is selected, corresponding with specific factory settings of Contrast, Colour, Sharpness, Colour Enhancement, DNR and Dynamic Contrast.

Personal refers to the personal preference settings of picture and sound selected in the picture and sound menu.

Remark: the moment you are in a predefined smart sound or picture setting and you modify a setting in the picture or sound menu, all values of the menu will overwrite the previously made

Personal settings. The predefined factory settings remain unchanged.

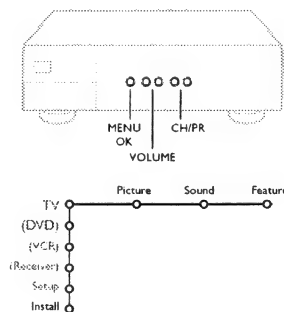
Keys in front of the TV receiver box

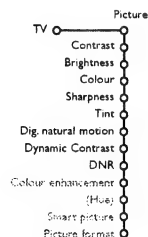
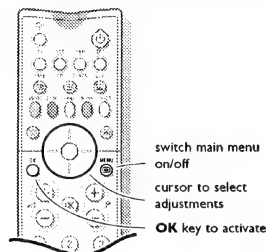
Should your remote be lost or broken you can still use the keys in front of the TV receiver box.

- Press the **VOLUME** - or + key to adjust the chosen volume.
- Press the **CH/PR** - and + key to browse through the TV channels or sources stored and to select them.
- Press the **MENU** key to summon the main menu. Use the **VOLUME** - and + keys to select the menu item. Use the **CH/PR** - and + keys to select the **TV**, **(DVD)**, **(VCR)**, **(Receiver)**, **Setup**, **Install** menu or **Exit**, or to select the submenu items.

Note:

- Sometimes not all the menu items are visible on the screen. Press the **CH/PR** + key to reveal all items.
- The **Exit** menu lets you dismiss the menu. Select **Exit** and press the **MENU** key.





TV menu

Press the **MENU** key on the remote control to summon the main menu.

Note: When the main menu is accessed from the keypad in front of the TV receiver box, it has an additional Exit item, which lets you dismiss the menu.

Warning: The main menu is completely different when a VGA source is displayed. See p. 27.

Picture menu

Press the cursor right to select **Picture**.

Select the menu items in the Picture menu with the cursor up/down. Adjust the settings with the cursor left/right or enter the list of submenu items with the cursor right.

Select a submenu item with the cursor up/down.

Note: To remove the menu background before adjusting the picture settings, see Select TV setup, General, p. 7.

Contrast

This control allows you to adjust the contrast level of the picture.

Brightness

This control allows you to adjust the brightness level of the picture.

Colour

This control allows you to adjust the colour saturation of the picture.

Sharpness

This control allows you to adjust the edge definition of a picture.

Tint

This control allows you to select the colour temperature of the picture: **Normal**, **Warm** or **Cool**.

Digital natural motion

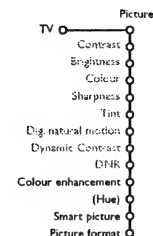
Line doubling eliminates line flicker, motion compensation reduces jitter and offers smooth, yet sharp motion reproduction in movie broadcasts. Select **On** or **Off** to really see the difference in picture quality.

Dynamic Contrast

This feature automatically makes the contrast in the darker and the brighter picture areas more noticeable as the image on screen changes. Normally, select **Medium**. It may be preferred to select **Minimum**, **Maximum** or **Off**.

DNR (Digital Noise Reduction)

This feature automatically filters out and reduces the image noise and improves picture quality when receiving weak video signals. Select **Off**, **Minimum**, **Medium** or **Maximum** according to the image noise present.



Colour enhancement

When activated, this feature automatically controls green enhancement and blue stretch. It makes the colours more vivid.

Select **On** or **Off** in order to activate/de-activate Colour Enhancement with the cursor right.

Hue (only available when a NTSC peripheral is connected)

This control allows you to adjust the colour mix of the picture.

Smart picture

This menu item performs the same as the Smart key on the remote control. See Use of the remote control, p. 12.

Smart settings will be set to **Personal** if the following settings are changed manually: contrast, brightness, colour, sharpness, dynamic contrast, colour enhancement or DNR.

Picture format

This menu item performs the same as the key on the Remote Control. See Use of the Remote Control, p. 11.



Sound menu

Select the menu items in the Sound menu with the cursor up/down and adjust the settings with the cursor left/right.

Remember, control settings are at normal mid-range levels when the bar scale is centered.

Note: In case of a Cinema Link configuration and the Cinema Link is activated, the menu functions Surround mode, Night mode and Audio only of the Sound menu are steered by the audio receiver instead of by the receiver box. See the separate Cinema Link booklet supplied.

Volume

This control allows you to adjust the volume level.

Treble

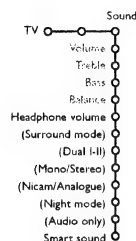
Treble attenuates or amplifies the high-frequency response of the audio output signal.

Bass

Bass attenuates or amplifies the low-frequency response of the audio output signal.

Balance

This control allows you to adjust the balance of the right and left speaker's sound output.



Headphone volume

This control allows you to adjust the volume level of the headphone.

Surround mode

Only selectable with a Cinema Link configuration. See separate booklet supplied.
Dependent on the Cinema Link configuration and the sound signal broadcasted, select one of the Surround modes.

Dual L-R (Only available with dual sound transmission)

This control allows you to switch from Language I or Language II during dual sound transmission.
Your selection is stored per TV channel.

Mono/Stereo (Only selectable in case of analogue stereo transmission)

Select Mono or Stereo with the cursor left/right.
When Stereo has been selected, the television will reproduce any stereo broadcast signal it receives.
If Stereo is not present on a selected programme and the TV is placed in Stereo mode, the sound coming from the set will remain monaural.
Your selection is stored per TV channel.

Nicam/Analogue (Only selectable in case of Nicam transmission)

Select Nicam or Analogue if the TV channel transmits digital sound.
In case of weak digital sound signals, due to the transmission, select Analogue.
Your selection is stored per TV channel.


Night mode

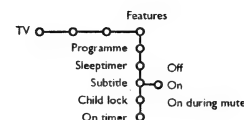
Only selectable with a Cinema Link configuration. See separate booklet supplied.

Audio only

Only selectable with a Cinema Link configuration. See separate booklet supplied.

Smart sound

This menu item performs the same as the Smart sound  key on the remote control. See Use of the remote control, p. 12.
Smart settings will be set to Personal if the following settings are changed manually: treble and bass.



Features menu

Select the menu items in the Features menu with the cursor up/down and adjust the settings with the cursor left/right.

Programme list

This list will display all the stored TV channels.
Select a programme number with the cursor up/down.
Press the OK key to switch over to the selected TV channel or external.

Sleep timer

With the sleep timer you can set a time period after which the TV should switch itself to standby.
The counter runs from 0 min. up to 180 min.
One minute before the TV is set to go to standby, the remaining seconds and a message appears on screen. You can always switch off your set earlier or change the set time.

Note: When a VGA source is selected, the TV will not go to standby when the sleep timer expires.

Select subtitles


TV channels with teletext often transmit programmes with subtitling. For each TV channel you can store a subtitle page which will be displayed continuously if the programme being broadcast is transmitted with subtitles.

Switch on teletext and select the proper subtitle page from the index.
Switch off teletext.

Now the subtitle page is stored for the selected TV channel.

Once subtitles have been stored and Subtitle On has been selected they will automatically be displayed on the selected TV channels if subtitles are in the transmission.

A symbol will indicate that the mode is on.

Select On during mute when you want to have the subtitles automatically been displayed when the sound has been temporarily interrupted with the  key on the remote control.

Child lock

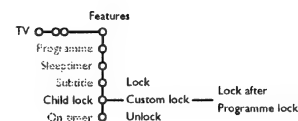
The Child lock feature allows you to lock TV channels and externals to prevent children from watching certain programmes. AVGA source can not be locked.

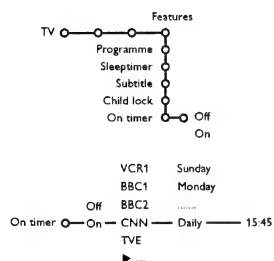
- 1 Select Child lock with the cursor down.
- 2 Press the cursor right to enter the Child lock menu.
You're summoned to enter your code. Enter the access code.
Note: You have to re-enter your code each time you've left the child lock menu.

Important: You have forgotten your code !

- Select Cancel with the cursor down.
- Select Set/Change code in the Setup menu.
See General menu, Set/Change code, p. 8.

- 3 Select one of the menu items of the child lock menu.
 - Select Lock if you want to lock all channels and externals.
 - Select Custom lock and press the cursor right.
 - Select Programme lock if you want to lock the programmes from a certain TV channel or external.
 - Select Lock after if you want to lock all programmes from a certain time onwards.
- Press the cursor right and enter the time with the cursor up/down and right. Press the OK key to validate.
- Note: The entered time will remain valid for every day, until you have selected Unlock.
- Select Unlock to unlock all locked channels and externals at once.





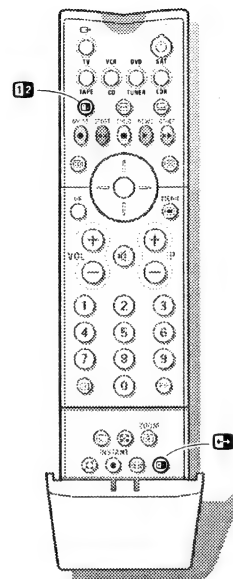
On timer

With the On timer function you can make your TV automatically switch to a specific programme number from standby or switch over to a different programme number at a specific time.

Note: Your TV receiver box and your monitor should not be powered off with the power key.

- 1 Select **On timer** with the cursor down.
- 2 Select **On** with the cursor right.
- 3 Press the cursor right again to enter the channel list.
- 4 Select the TV channel or external you want your TV to switch to on a selected time and day. Not possible with a VGA source.
- 5 Press the cursor right again to select a day of the week or to select **Daily**.
- 6 Press the cursor right once again to enter the time.
- 7 Enter the time with the digit keys or with the cursor up/down.
- 8 Press the **OK** key to activate.
- 9 Press the **MENU** key to turn off the menu.

Note: To check your timer settings, press the key.



Dual screen/PIP (FTR 9964 only)

Press the **12** key to turn on or off Dual screen or PIP, according to the format selection made in the Dual screen format list in the General menu. See Setup, General, p. 7.

Audio from the main screen (the left screen in Dual screen and the full size screen in PIP) plays to the speakers;
Audio from the right screen or from the PIP plays to the headphones.

*Note: Continuing to hold the **12** key down will cycle the TV through the various formats (Dual screen, Large PIP, Medium PIP, Small PIP), launching a new format after each second the key is held down.*

To highlight a screen

Pressing the cursor left/right will toggle the highlight between the left and the right screen or between the main and the PIP screen.
The highlighted screen is made visible with a yellow border.

Changing TV channels or external sources in left, right or PIP screen

Press the **- P +** key, the digit keys or the **P+P** key in order to change the TV channels or the external sources in the highlighted screen.

Making the PIP screen movable

- 1 Select a PIP format.
- 2 Highlight the PIP picture with the cursor left/right.
- 3 Press the **OK** key to make the PIP screen movable.
The PIP screen can now be moved. This is made visible with a blue border around the PIP screen.
- 4 Press the cursor up/down, left/right to move the PIP screen in the direction of the cursor press.
- 5 Press the **OK** key again. The PIP screen position is fixed.

Swapping screens

Press the **C+** key to swap the left and the right screen or the PIP screen. See notes below.

On-Screen information

The On-Screen information, which appears when changing channels, always refers to the highlighted screen.

Deactivating Dual screen mode


Press the **12** key again to return to a full main screen picture.
The TV tunes to the picture which was highlighted in Dual screen mode.

Notes:


When Dual screen mode is selected, two picture formats are supported: Full screen or 4:3 letterbox picture format.

Multipip (FTR 9954 only)

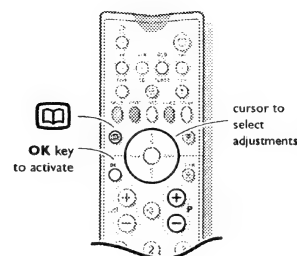
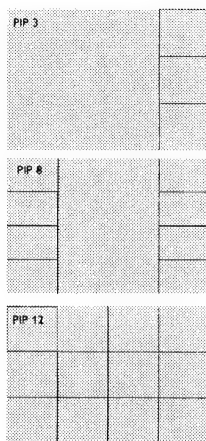
In the Setup menu, General, p. 8 you selected which Multipip format you prefer to see.

- Press the  key on the remote control to toggle the selected Multipip format **On** or **Off**.
The main screen displays the channel or source tuned before Multipip was activated and the highlight is on the main screen.
- Press the cursor left/right, up/down to highlight a PIP screen. When the highlight is on one of the PIP screens, it begins playing video and the other PIPs freeze. The main screen always continues playing audio and video.
- Pressing the **- P +** or the **P-P** key or the digit keys changes the channel or source for the currently highlighted screen.

Note: channels cannot be added or deleted from the Smart surf list when Multipip is activated.

- Press the  key to swap the highlighted screen and the main screen.
- With PIP 3 and PIP 8, press the cursor up/down to display a following series of PIP screen.
With PIP 12: highlight the PIP picture in the bottom right and press the cursor down to display a following series of PIP screen.


*Note: Only TV channels which are in the favourite list and pictures from the connected and activated externals are displayed in the PIP screen.
PIP 3 and PIP 8 are not possible when a VGA source is displayed as main screen.*

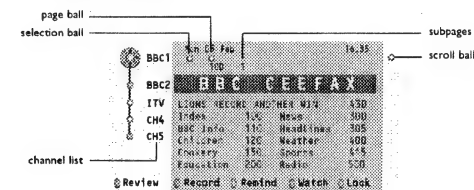


Teletext Guide


TV channels which broadcast teletext also transmit a page with the programme guide of the day.

If the displayed teletext programme guide page satisfies the Video Programming via Teletext (VPT) requirements, it will be possible to record, remind, watch or lock programmes.

- Press the  key.
- Select a TV channel with the cursor up/down and press **OK**.
- Move the cursor up to the top of the channel list where the name of the selected TV channel reappears.
- Press the cursor right to move the puck over the selection ball.
- In the teletext index page, look for the programme guide page of the day or the following day.
- Enter with the digit keys, the programme guide page number.
Press the cursor right twice to move the puck to the right to choose one of the subpages if available.



If the selected programme satisfies the VPT requirements, the TV will remember the last selected teletext page number of that channel that contains programme guide information and indicates which programme starts at what time.

Every time you press the  key, the teletext programme guide page of the selected TV channel will be available.

Note: The broadcaster is responsible for the content of the information.

Basic functions

Press one of the grey, red, green, yellow or blue keys to activate a Teletext Guide function. The keys appear in grey if the function is not available.

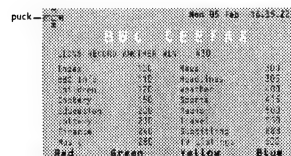
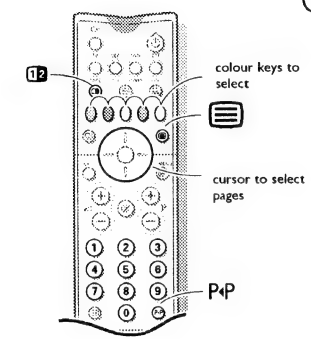
Review: this menu provides a list of programmes that are marked as reminders, those that have to be recorded and those that are locked. This menu can be used to change or remove marked programmes.

Record: to programme the recording of the video recorder (if it has a NEXVIEWLink function and is connected to **EXT. 2**).

Remind: to automatically switch on the TV if it is in standby or to display a message if the TV is on.

Lock: to lock certain programmes to prevent recording or watching.
For the functions Record, Remind or Lock, a small menu pops up in which you can choose the interval: once, daily or weekly, or clear an earlier made record, remind or lock setting. The default interval is set to Once. To confirm the frequency, press the **OK** key.

Watch: to watch the selected and currently broadcast programme.



Teletext

Most TV channels broadcast information via teletext. Depending on the TV channel, teletext is transmitted in different systems. The colours used in the bottom line of the teletext page correspond with the colour keys of your remote control.

Switch Teletext on and off

Press to switch the teletext on or off. The main index page appears on the screen together with an information line at the top, an option line at the bottom and a puck in the top left corner of the screen.

Select a Teletext page

With the digit keys
Enter the desired page number with the digit keys. The page counter seeks the page or the page appears immediately when the page number has been stored in the memory.
A message appears when you have entered a non-existent or incorrect page number. Page numbers beginning with 0 or 9 do not exist. Choose another number.

With the option line
Select with the colour keys, corresponding to the coloured options at the bottom of the screen, the desired subject.

Select Picture/Teletext

Select a TV channel which broadcasts teletext. Press to switch the teletext on. Press the key. The screen is divided into two parts: the left side for the normal main picture, the right side for teletext broadcast by the selected TV channel. Press the key to return to a full screen picture or press the key to return to a full teletext picture.

Quickly run through the teletext pages

Press the cursor up/down or the - P + key to run through the previous or the following pages.

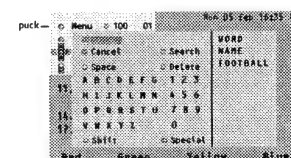
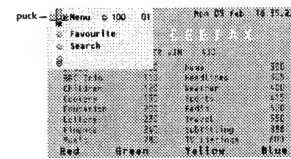
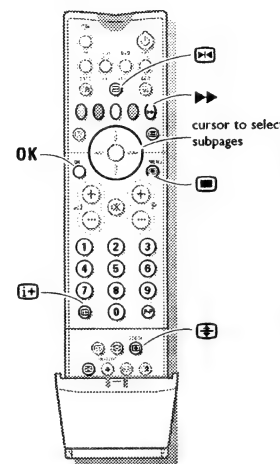
Select the previously selected teletext page

Press the P+P key.
Note: Only possible when teletext pages are active, not when the Teletext menu is displayed.

Select the index teletext page

Press the grey colour key to display the main index (usually p.100).

Only for T.O.P. teletext broadcasts :
T.O.P. orders the pages in categories and adds other possibilities of enhancing ease of use.
Press . A T.O.P. overview of the teletext subjects available is displayed. Not all TV channels broadcast T.O.P. teletext. When the teletext system is not T.O.P. teletext, a message appears at the bottom of the screen. Select with the cursor up/down, left/right the desired subject and press the OK key.



Select subpages

When a selected teletext page consists of different subpages, one of the subpages appears on the screen. Press the cursor right to highlight the subpagenumber. Press the cursor up/down to select the next or previous subpage or enter the subpagenumber with the digit keys.

Teletext menu *(only available in full screen teletext mode)*

- 1 Press the MENU key to activate the menu.
- 2 Press the cursor up/down to select the menu items.

Favourite

This list contains up to eight favourite teletext pages. Only the pages of the current channel can be selected.

- 1 Press the cursor right to add the current page or to select one of the favourite pages to the list.
- 2 Press the OK key or the cursor right again to add.
- 3 Press the cursor left to return to the Teletext menu.

Search

On the virtual keyboard on screen you can type in a word you want to search for in the teletext pages. Whether upper- or lowercase is used has no influence. Searching for numbers is not possible.

- 1 Press the cursor left/right, up/down to select the characters, words or functions.
- 2 Press the OK key to confirm each character selected.
- 3 Select Cancel to cancel the word or character selected. Select Space to enter a space. Delete to delete the last character selected; Shift to switch between underscore and capital characters; Special to display special characters on the keyboard.
- 4 Press the cursor left repeatedly to return to the Teletext menu again.

Searching a word

- 1 Type in the word on screen or select a word from the history list on the right. Whether upper- or lowercase is used has no influence. Searching for numbers is not possible.
- 2 Select Search and press OK again. The message Searching appears. When the word is found, it is highlighted in the teletext page.
- 3 To continue the search, press the OK key twice. When a word is not found, a message appears.
- 4 To search for a new word, select Keyboard and press OK.
- 5 Select the new word.

Reveal

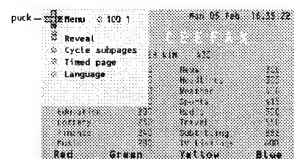
Reveals/conceals hidden information on a page, such as solutions to riddles and puzzles. Press the OK key to activate. Press OK again to return to the Teletext menu.

Cycle subpages

Makes the subpages cycle automatically. Press the OK key to activate.

Timed page

- 1 To display a specific page at a certain time. Press the cursor right to select Yes or No.
- 2 Enter the time and pagenumber with the cursor keys or the digit keys.
Note: Teletext does not have to remain switched on. It is not possible to display a timed page when in VSA mode or when the TV is switched to standby.



Language

If the displayed characters on screen do not correspond with the characters used by the teletext broadcaster, you can change the language group here.

Select **Group 1** or **Group 2** with the cursor keys left/right.

To leave the Teletext menu

- 1 Press the **MENU** key.
- 2 Press the cursor right.
- 3 Press the cursor left twice to put the puck on the neutral spot again.

Special teletext functions

Hold

Press **Hold** to stop the automatically rotating of the subpages or to stop the page counter from seeking when you have entered a wrong page number or when the page is not available. Enter another page number.

Enlarge

Press **Enlarge** repeatedly to display the upper part, the lower part and then to return to the normal page size. When the upper part is displayed, you can scroll the text, line by line using the cursor up/down.

Hypertext

With hypertext you can select and search for any word or number on the current teletext page.

- 1 Make sure you are not in the teletext menu and that the puck is in the upper left corner of the screen.
- 2 Press the cursor key down to highlight the first word or a number on the page.
- 3 Use the cursor up/down, left/right to select the word or number you want to search for.
- 4 Press the **OK** key to confirm.
A message appears at the bottom of the screen to indicate that the searching is going on or that the word or page is not found.
- 5 Press the cursor right to leave hypertext.

Select Continuous Subtitles

TV channels with teletext often transmit programmes with subtitling. For each TV channel you can store a subtitle page which will be displayed continuously if the programme being broadcast is transmitted with subtitles.

Switch on teletext and select the proper subtitle page from the index.
Switch off teletext.

Now the subtitle page is stored for the selected TV channel.

Once subtitles have been stored and **Subtitle On** has been selected they will automatically be displayed on the selected TV channel if subtitles are in the transmission.

Select **Subtitle On** or **Off** in the Features menu, see p. 16.

The subtitle symbol appears when **Subtitle On** is selected.

Connect Peripheral Equipment

There is a wide range of audio and video equipment that can be connected to your receiver. The following connection diagrams show you how to connect them to the back or the front side of the receiver.

Note: In case of the monitor in a stand alone situation without the receiver box connected, see the instructions with the monitor.

Philips Cinema Combination

If you dispose of a Home Cinema combination (Cinema Link audio receiver and/or Cinema Link video recorder and/or DVD player), see the separate supplied instruction manual.



Video recorder

Note: Do not place your video recorder too close to the screen as some video recorders may be susceptible for signals out of the display. Keep a minimum distance of 0.5 m to the screen.

Connect the supplied aerial cables ①, ②, and, to obtain a better picture quality, a eurocable ③ as shown opposite.

If your video recorder is provided with the EasyLink function, the eurocable supplied with it, should be connected to EXTERNAL 2 to benefit of the EasyLink function.

Only if you do not connect the eurocable ③, you have to do the following:

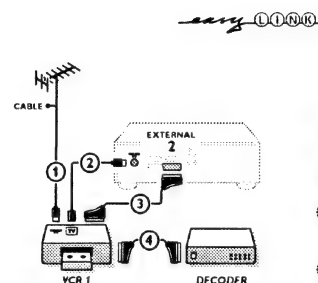
Search for and store the test signal of the video recorder

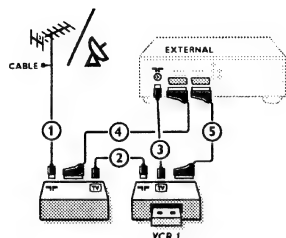
- 1 Unplug the aerial cable ① from the aerial socket **T** of your video recorder.
- 2 Switch on your TV and put the video recorder on the test signal. (See the handbook for your video recorder.)
- 3 Search for the test signal of your video recorder in the same way as you searched for and stored the TV signals. See Installation, Searching for and storing TV channels, Manual Installation, p. 6.
- 4 Store the test signal under programme number 0 or between 90 and 99.
- 5 Replace the aerial cable in the aerial socket **T** of your video recorder after you have stored the test signal.

Decoder and video recorder

Connect a eurocable ④ to your decoder and to the special euroconnector of your video recorder. See also the video recorder handbook. See Decoder, p. 9.

You can also connect your decoder directly to **EXTERNAL 1** or **2** with a eurocable.



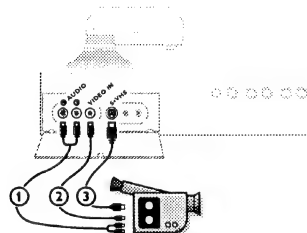


Video recorder and other peripherals

- 1 Connect the aerial cables (1), (2) and (3) as shown opposite. Better picture quality can be obtained if you also connect eurocable (5) to EXTERNAL 2 and a eurocable (4) to EXTERNAL 1, 3 or 4.
- 2 Look for the test signal of your peripheral in the same way as you do for a video recorder.

When a video recorder is connected to EXTERNAL 1 you can only record a programme from your TV tuner.
Only when a video recorder is connected to EXTERNAL 2 it is possible to record a programme from your TV as well as from other connected equipment. See Record with your video recorder, p. 30.

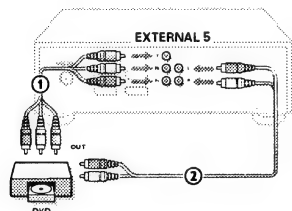
Note: EXTERNAL 1 can handle CVBS and RGB, EXTERNAL 2 CVBS, Y/C and RGB, EXTERNAL 3 and 4 only CVBS, EXTERNAL 5 YUV.



Camera & camcorder

- 1 Connect your camera or camcorder to the FRONT input behind the door at the front side of your receiver. Press the centre of the door to open.
- 2 Connect the equipment to VIDEO IN (2) and AUDIO L (1) for mono equipment.
- 3 For stereo equipment also connect AUDIO R (1).

S-VHS quality with an S-VHS, Hi-8 or Digital camcorder is obtained by connecting the S-VHS cables with the S-VHS input (3) (instead of VIDEO IN (2)) and AUDIO inputs (1).



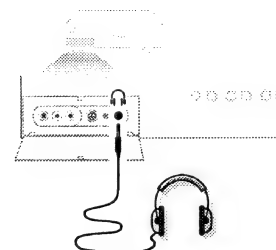
DVD Player

With euroconnector

Connect your DVD player with a eurocable to one of the euroconnectors EXTERNAL 1 or 2.

With Component Video Output Connectors (EXTERNAL 5)

- 1 Connect the three separate component video cables to the DVD player's Y, U (Pb) and V (Pr) jacks and to the Y, Pb and Pr jacks on the receiver.
- 2 Connect the audio cable to the DVD player's audio L and R jacks and to the L and R audio EXTERNAL 5 jacks on the receiver.



Headphone

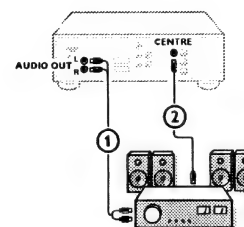
- 1 Insert the plug into the headphone socket (3.5 mm jack) behind the door at the front side of the receiver. Press the centre of the door to open.
- 2 Press M to switch off the internal loudspeakers of the TV.
The headphone impedance must be between 8 and 2000 Ohm.
The headphone socket has a 3.5 mm jack.

In the **SOUND** menu select **Headphone volume** to adjust the headphone volume and balance and to select the audio source for your headphone sound. See p. 15.

Note: When a TV channel or external source is blocked via the Childlock menu (see p. 16), also the headphone is muted.

When Dual screen PIP is activated (see p. 18) (FTR 9964 only):

- if the main screen displays a TV channel picture, you hear the sound from the Dual screen PIP picture through your headphones;
- if the main screen displays a picture from an external source, you hear the sound from the main screen through your headphones.



Multi channel Surround receiver

- 1 Connect the audio cable to the multi channel Surround receiver and to AUDIO OUT L and R at the back of your TV receiver box (1).
- 2 If you want the loudspeakers of your monitor to act as centre speaker, also connect an audiocable to the multi channel Surround receiver and to the SURROUND SOUND CENTRE IN at the back of your TV receiver box (2).
- 3 Select Centre mode On in the Setup, General menu. See p. 9.

The loudspeakers of the monitor will now only produce centre sound, the loudspeakers connected to the audio receiver will produce Surround Sound. The volume has to be controlled via the multi channel Surround receiver.

Note: No sound will be heard when a TV channel or external source is blocked via the Child lock menu (see p. 16).

Connect your computer

See the separate supplied instruction manual with your monitor.

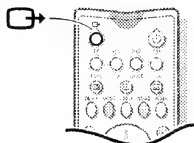
To select connected equipment

Equipment connected with an aerial cable only :
Select the programme number under which you have stored the test signal with the digit keys.

Equipment connected to a euroconnector, to the VGA MONITOR IN connector or to the front side of the receiver box
Press the key repeatedly to select EXT1, EXT2, EXT3, EXT4, EXT5, FRONT or VGA, according to where you connected your equipment at the back or the front side of your receiver.
Press the **OK** key to confirm.

Remark : Most equipment (decoder, video recorder) carries out the switching itself. This is however never the case with a computer connected to the VGA input.

If you want to change to TV channels?
Enter the programme number of the TV channel which you want to watch with the digit keys.



VGA menu

Only available when a VGA source has been connected and activated. See also the separate supplied instruction manual with your monitor.

- 1 Select **VGA** with the key and press the **OK** key to confirm.
- 2 Press the **MENU** key to switch on the **VGA** menu.



- 3 Select one of the menus with the cursor left/right.
- 4 Select one of the menu items with the cursor up/down.

See the separate booklet supplied with the monitor.

Picture 1

- Brightness,
- Contrast,
- Colour temperature,
- Sharpness,

Picture 2

- Format,
- Zoom,
- Zoom factor,
- Shift,
- Clock frequency,
- Phase,
- Auto align

Sound

- Volume,
- Bass,
- Treble,
- Sound mode

Setup

- Language,
- Power savings,
- AV3,
- VGA2

- 5 Press the cursor left/right to alter the selected adjustment.
- 6 Press the **MENU** key again to switch off the **VGA** menu.

Video recorder with EasyLink

The video recorder can be operated via the VCR menu on screen.

- 1 Press the **MENU** key on the remote control.
- 2 Select the **VCR** menu with the cursor up/down.



- 3 Press the cursor left/right, up/down to select one of the VCR functions:

- Rwd** rewind,
- Play** play back: scan at **Slow, Min, Med, Max** speed
- Stop** stop,
- Ffw** play forward: scan at **Slow, Min, Med, Max** speed,
- Rec** record,
- Eject** select and press the **OK** key to eject the tape.

The key **INSTANT** for recording, under the door of the remote control, can be operated in the TV mode.
If your EasyLink video recorder has the system standby function, when you press the key for 3 seconds, both TV and the video recorder are switched to standby.

Audio and video equipment keys

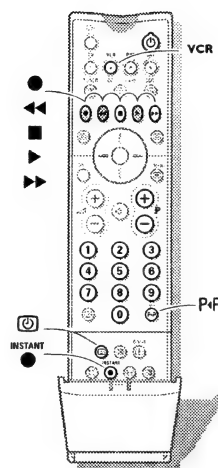
Most of the audio and video equipment from our range of products can be operated with the remote control of your TV.

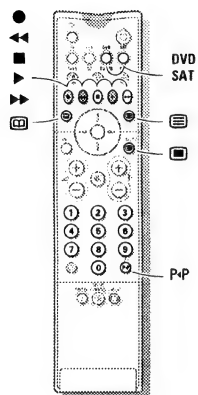
Press the **VCR, DVD, SAT, TUNER, CD, TAPE** or **CDR** key according to the equipment you want to operate with this remote control. See Use of the remote control, p. 10.

Video recorder without EasyLink

Press one of the video recorder keys after you pressed the **VCR** key:

- for record,
- for rewind,
- for stop,
- for play,
- for fast forward,
- for selecting 1- or 2-digit programme numbers from the video recorder,
- for sequential programme selection from the video recorder tuner,
- to select a programme number from your video recorder tuner,
- to switch the video recorder to standby
- VCR timer





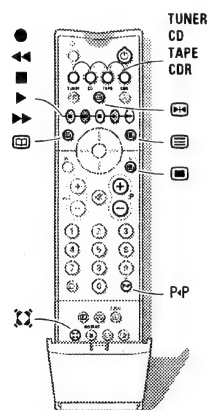
DVD keys

Press one of the following keys after you have pressed the DVD key.

- to switch the DVD menu on or off
- to select a DVD chapter
- to select a DVD title
- to select your choice of subtitle language
- for search backward
- for stop
- for play
- for search forward
- for pause
- 0-9 to select a programme number from your DVD

Satellite receiver

Press one of the TV keys after you have pressed the SAT key.



Tuner, CD, Tape and CDR keys

Press one of the following keys after you have pressed the TUNER, CD, TAPE or CDR key.

- to switch the menu on or off (tuner)
- to select a frequency (tuner)
- to record
- to search down (tuner); rewind (CD/tape); speed down (CDR)
- stop
- play
- to search up (tuner); forward (CD/tape); speed up (CDR)
- RDS news/TA (tuner); select following disc (CD/CDR)
- pause (CD/CDR/tape)
- RDS display (tuner); info on screen (CD/CDR)
- P + next/previous (CD)
- surround modes (CD/CDR/tape)

Record with your video recorder without EasyLink

To record S-VHS quality, connect an S-VHS peripheral directly to the video recorder.

Record a TV programme

- 1 Select the programme number on your video recorder.
- 2 Set your video recorder to record.
See the handbook for your video recorder.

Switching programme numbers on your TV does not disturb recording!

Record a programme on your video recorder connected to EXTERNAL 2 from Audio/Video equipment connected to EXTERNAL 1, EXTERNAL 3, EXTERNAL 4, EXTERNAL 5 or to sockets on the receiver

- 1 Switch on the equipment.
- 2 Select the correct external on your video recorder.
- 3 Set your video recorder to record.
You record what you are watching on the screen.

Do not switch programme numbers or do not switch off your TV when you are recording!

Record with your video recorder with EasyLink

If you have connected an S-VHS video recorder provided with the EasyLink function, you can record S-VHS quality from an S-VHS peripheral connected to the front side of the receiver. (E.g. from an S-VHS camcorder.)

In TV mode, it is possible to start a direct recording of the programme which is being displayed on the TV screen.

- 1 Press the **INSTANT** record key, under the door of the remote control of the TV or of the video recorder or the record key on the video recorder.
The video recorder switches on from standby and a message of what is being recorded appears on the screen.
The video recorder starts recording the programme you are watching.
- 2 Press the key to stop the recording.

Do not switch programme numbers or do not switch off your receiver when you are recording!

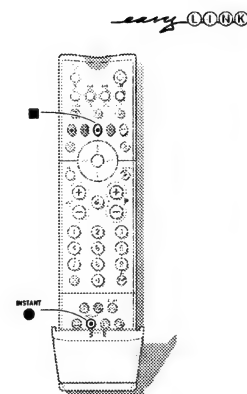
When recording a programme from a peripheral connected to EXTERNAL 1, 3, 4, 5 or INSTANT, you can not select another TV programme on the screen.
To watch TV programmes again, press the programme number you want to select twice.

Attention: the recording is stopped and your video recorder switches to standby.

If you switch to standby during recording of a programme from a peripheral connected to EXTERNAL 1, 3, 4, 5 or INSTANT, the blinking lamp on the front of your receiver indicates that you are still recording. The blinking stops after the recording is finished.

Attention:

Recording from EXTERNAL 5 will only have black and white pictures.



Tips

Poor Picture

- Have you selected the correct TV system?
- Is your monitor or house aerial located too close to loudspeakers, non-earthed audio equipment or neon lights, etc.?
- Mountains or high buildings can cause double pictures or ghost images. Sometimes you can improve the picture quality by changing the direction of the aerial.
- Check if you have entered the correct frequency. See Installation, p. 6.
- Are brightness and contrast out of adjustment? Select Factory settings in the Setup, General menu, p. 8 or press the **SMART** ☐ key repeatedly.

No picture or no sound

- Are the supplied cables connected properly? (The aerial cable to the TV receiver box, the other aerial to your VCR, the VGA cables to the display, the power cables.)
- Has the childlock (p. 16) been switched off?
- Is your PC switched on?
- Has the Centre mode been switched off?
- Do you see a black screen and the indicator in front of the monitor lights up green, this means that the display mode is not supported. Switch your VGA-source to a correct mode.
- In case of weak or bad signal, consult your dealer.

Remote control

- If your monitor no longer responds to the remote control, the batteries may be exhausted.
- You can still use the **MENU** keys at the front of your receiver.

Menu

Have you selected the wrong menu? Press the same key again to exit from the menu.

Control of peripheral equipment

The infrared signals of the screen may influence the reception sensibility of other peripherals.

Solution: replace the batteries of the remote control or change position of other equipment. E.g. keep away a wireless headphone from within a radius of 1.5 m.

TV-Guide - Displayed time is wrong

The broadcaster on programme number one does not transmit the correct local date and time. Use **Reshuffle** in the

INSTALLATION menu to place another broadcaster on programme number one.

No stable or not synchronised VGA picture

Check if you have selected the correct VGA mode in your PC. See the separate instruction manual with the monitor.

If your problem is not solved:

Switch both your monitor and your receiver off and then on again.

Never attempt to repair a defective monitor or receiver yourself.

Check with your dealer or call a TV technician.

End of life directives

We are paying a lot of attention to using environmentally-friendly production methods. Your new flat colour television contains materials which can be recycled and reused.

At the end of life specialised companies can dismantle the discarded flat colour television to concentrate the reusable materials and to minimise the amount of materials to be disposed of.

Please ensure you dispose of your old flat colour television according to local regulations.

How to dispose of exhausted batteries?

The batteries supplied do not contain the heavy metals mercury and cadmium. Nevertheless in many countries exhausted batteries may not be disposed of with your household waste. Please ensure you dispose of exhausted batteries according to local regulations.

TV receiver box with speakerless monitor

In case you connect your TV receiver box with a speakerless monitor, and without having connected an audio receiver, all references made in this instruction book to sound reproduction, volume control, and audio connections, are not applicable (except for a headphone connection).

The keys on the remote control referring to sound have no function either.

Miscellaneous

- Ambient temperature: + 5~ + 40°C
- Mains: 50/60 Hz Auto Voltage ranging from 95 V to 264 V
- Power consumption: around 35 W
- Standby consumption: 2 W
- Weight (excl. packaging): 4 kg
- Dimensions (wxdxh):
Receiver: 43.5 x 10.5 x 33 cm

Glossary

Automatic Channel Installation (ACI)

Automatically installs all TV channels in the same order as offered by your cable company, provided of course that the data is transmitted. It also automatically includes programme number and programme name.

With ACI, channel installation is fully automatic, simple and fast.

Child Lock

Feature to prevent unauthorised use of your TV. The TV can only be switched on and operated with the remote control.

Cinema Link

Cinema Link is a new Philips feature in which the TV, the audio receiver and other video peripherals like DVD player and video recorder communicate with each other, on condition they are all equipped with the Cinema Link functionality and connected via a eurocable. They automatically offer the highest quality combination of picture and multi channel surround sound to create your own Home Cinema.

DNR

Dynamic Noise Reduction.
By encoding signals digitally in 100 Hz sets with Digital Scan it is possible to clean up picture noise. This is especially beneficial in poor signal areas and when viewing poor quality video tapes.

Easy Link

Digital 'intelligent' ESI bus-system between audio components in HiFi systems and between TV and VCR. (Scart connection required). Turns source selection and control into a one-key operation.

Easy Text

Teletext memory that automatically memorises Teletext pages and gives you instant access to them.

Euroconnector

A 21-pins connector system enabling you to simply connect various types of audio/video and computer equipment.

Menu

On-screen display of functions and facilities in a well-organised survey.

NTSC

The broadcasting system used in the USA, Japan and parts of South America and Southeast-Asia.

Picture Freeze

TV mode which allows you to "freeze" a certain image in order to study a specific detail at ease, e.g. to make notes of certain programme information like phone numbers.

Smart Picture and Sound Controls

Keys on the remote control to select predefined picture and sound settings.

Sleeptimer

Function with which you can set a time period after which the TV should switch itself to standby.

Teletext

See also Easy Text
WST: World Standard Teletext.
FLOF: Full Level one Features. System applied by the BBC, RVE.... that provides a fast access to the teletext pages.
TOP: Table of (Teletext) Pages. German system for an easy access to the teletext pages.

Wide screen format

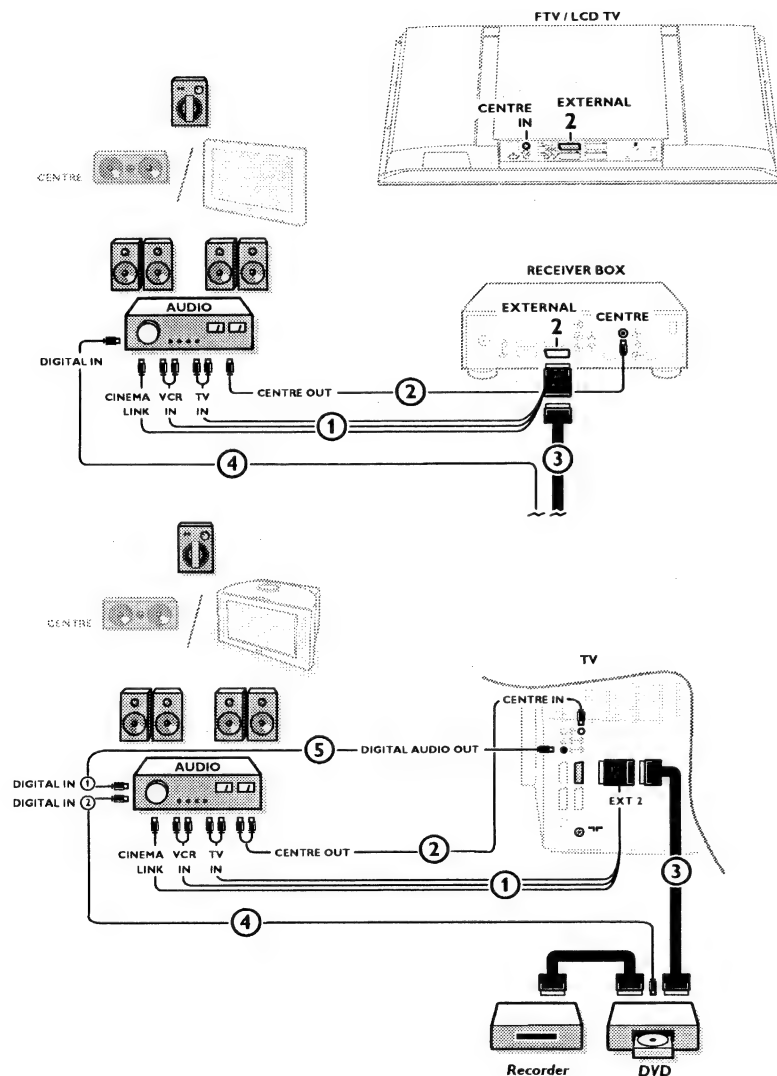
Some external devices (e.g. VCR, DVD, SAT) can be configured with their local menus to output pictures in 16:9 picture format. In this case the wide screen picture format makes the picture fill the screen without distortion.

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Note: The Cinema Link functionality is only available with devices of the Cinema Link (P50.3) generation !

Cinema Link is a new Philips feature in which the TV, the audio receiver and other video peripherals communicate with each other (on condition they all are equipped with the Cinema Link functionality and are connected via a eurocable). They automatically offer the highest quality combination of picture and multi channel surround sound to create your own Home Cinema.

With one key on the remote control, with which you can control all Cinema Link products, your total Cinema Link system will be started and the DVD or video recorder will start to play and the audio receiver will provide the sound (on the condition Cinema link is enabled) on behalf of the TV.

The TV or monitor can function as the centre speaker of your system, making a separate centre speaker unnecessary (only in case your TV or receiver box is equipped with a Centre IN connector). **By pressing the standby key  on the remote control for at least 3 seconds, the complete Cinema Link system will be switched to standby.**

Recommended:

Do not use the AC outlet at the back of the audio receiver to power the DVD or the video recorder in a Home Cinema configuration.

Configuration of the Cinema Link peripherals

The connection diagram in the inside cover shows you how to connect the Cinema Link peripherals with each other.

Notes:

- Besides the TV or receiver box at least one peripheral should be provided with the Cinema Link functionality to benefit from this feature.
- To take advantage of the highest quality of multi channel Surround sound it is advisable that you have a Cinema Link audio receiver connected.
- The peripherals connected don't need to see the TV remote control in the Cinema Link system. The commands given to the TV are automatically passed to the other peripherals. This allows you to put the peripherals behind the doors of a cabinet or to place them in another room.
- To enjoy Digital Surround playback, the digital device (e.g. DVD) should be connected to the digital input of the audio receiver with a separate cinch audio cable (4). In case your TV is provided with a DIGITAL AUDIO OUT connector, also connect it to one of the digital input connectors of your audio receiver (5). If you connect the digital audio output connector of your TV and/or peripheral equipment to a digital input connector of your audio receiver (4) and (5) (if present), select the appropriate digital input (1 or 2) in your audio receiver.
- The optional wireless speakers of the TV cannot be used.

Preparation and Operation

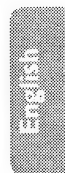
- 1 Cinema Link is switched on as soon as the audio receiver and the TV are switched on. If necessary, Cinema Link may be switched off or on again only on the audio receiver. See the instructions for use of your audio receiver.
Important: When Cinema Link is switched on all audio commands control the audio receiver instead of the TV.
- 2 The message **CINEMALINK ON** is displayed on the audio receiver and on the TV. Now the CinemaLink system is activated.
Note: it is recommended to disable CinemaLink when the receiver is used to record a CD e.g. or when using a headphone when others are watching TV.

Now you can adjust the initial TV settings for optimal surround sound and install the audio channels before starting up one of the CinemaLink devices. The system information about country choice, menu language and picture format you set up during the installation of the TV is transferred to the audio receiver automatically.


TV as centre speaker (only in case your TV or receiver box is equipped with a Centre IN connector)

See the Instructions for Use of the TV or receiver box, Setup, Source menu, Centre input. Use the test tone function in the Speakers menu to have a reference of the loudness of the separate speakers.

Note: If you want the loudspeakers of your TV or monitor to act as centre speaker, also connect a cinch audio cable (not supplied) (2) to the CENTRE IN connector of your TV or receiver box.

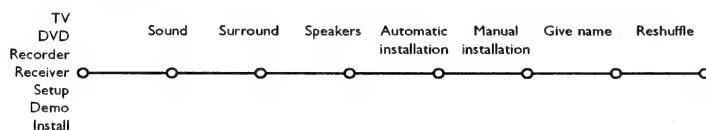


Activating CinemaLink

Continue to press the -key on the remote control for more than 4 seconds.

- ① The TV or receiver box sends a play command to the Cinema Link DVD player, if present.
- ② The DVD player will start playing and the audio receiver automatically switches to the best Cinema Link sound.
- ③ If no DVD player is connected or if the DVD player has no disc loaded, the command can not be executed.
- ④ The TV or receiver box will then send a play command to the Cinema Link video recorder, if present.
- ⑤ The video recorder will start playing and the audio receiver selects the best Cinema Link sound.
- ⑥ If no video recorder source is connected or tape is loaded, the TV or receiver box will select the last watched TV channel.

Receiver menu



Note: When Cinema Link is enabled, certain items of the Sound menu (see TV menu) are steered by the audio receiver instead of by the TV or receiver box.

- ① Press the **MENU** key on the remote control.
- ② Press the cursor down to select **Receiver**.
- ③ Press the cursor right to enter the Receiver menu items.
- ④ Press the cursor up/down to select the submenu items.

Note: the audio receiver submenu items may only be selected if provided by the audio receiver (dependent on the configuration setup and the sound signals transmitted).

Sound menu

Dependent on the audio receiver speakers configuration, you may not be able to select certain menu items.



Smart Sound, Treble, Bass

See the Instructions for Use for the TV or receiver box.

Loudness

When **Loudness On** is selected and when listening at low volume, the low and high frequencies are amplified so that the natural balance is restored.

3D effect

3D effect enables you to experience the effect of Dolby Surround Pro Logic without the need of having rear speakers connected or activated.

Select the level of 3D effect with the cursor left/right.

Night mode (only functional with Dolby Digital sound broadcasting input)

The loud parts of the sound are lowered and the soft passages are raised. You can enjoy surround sound without disturbing sleeping children or neighbours.

Audio only

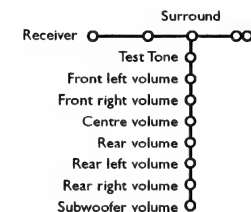
This control enables you to blank the TV picture if the TV or monitor is used as centre speaker in the Cinema Link system and if the audio receiver is reproducing sound unrelated to a TV picture.

Switch **Audio only On** to only hear the sound and to switch off the picture.

The message **Audio only** appears on screen.

Surround menu

Dependent on the audio receiver speakers configuration, you may not be able to select certain menu items.



Adjustment of the volume level of the loudspeakers

Note: the test tone function is automatically cancelled by the audio receiver when leaving the Surround menu.

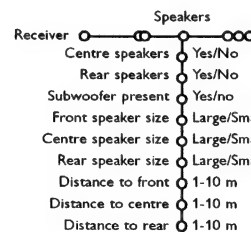
- ① Select **Test Tone On**.
A steady noise tone is switched sequentially through the available loudspeakers, except for the subwoofer, for 2 seconds each. This enables you to have a reference of the loudness of each loudspeaker and to adjust the level of each until they all sound equally loud.
The loudspeakers activated light up in the screen graphic.
- ② Select the Surround menu items with the cursor up/down one after another and alter the selected adjustments with the cursor left/right.
The best result is achieved when all speakers have equal volume in your usual listening position.
- ③ Select **Test tone Off** when you have finished the adjustment of the speaker levels.

Speakers menu

Dependent on the audio receiver speakers configuration, you may not be able to select certain menu items.

Once the number and position of the loudspeakers has been fixed, selecting Centre speaker, Rear Speakers and Subwoofer Yes or No, you can adjust the initial receiver settings, size and distance, for optimal surround sound.

Note: after changing the configuration, the menu will disappear temporarily and re-appear again after the new settings will be updated.



Size of the speakers

Select **Small** if your speaker is able to reproduce low notes down to at least 80-100 Hz. Select **Large** if your speaker is able to reproduce low notes down to at least 50 Hz.

Note:

- As a rule of thumb, a large speaker has a cone diameter of at least 12 cms (5 inches). See the specification sheet of your loudspeakers.
- If Subwoofer present is set to No, Front speaker size can only be set to Large. If Front speaker size is set to Small, Centre speaker size can only be set to Small and consequently a subwoofer must be connected.

Distance to the speakers

Select the distance from your usual listening position to the available speakers each; front, centre and rear speakers. This defines the delay time for the surround sound.

4. Mechanical instructions

Index of this chapter:

1. Disassembly and Panel Overview
 1. Top Cover Removal
 2. Panel Overview
2. Service Positions and Panel Removal
 1. Front I/O Panel
 2. Double Window Panel (if present)
 3. Power Supply Panel
 4. Feature Box Module
 5. Small Signal Panel
 6. Down Scaler Panel (if present)
 7. Audio/Video Interface Panel
 8. High Definition Panel
 9. 3D Comb Panel (US only)
3. Re-assembly

Note: Figures below can deviate slightly from the actual situation, due to the different set executions.

4.1 Disassembly and Panel Overview

4.1.1 Top Cover Removal

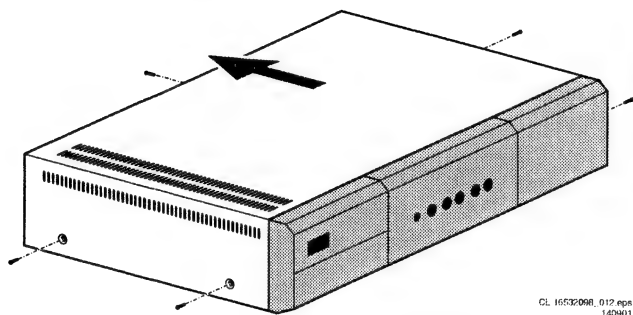


Figure 4-1 Top cover removal

1. For safety reasons, first unplug the mains cable.
2. Remove all fixation screws of the metal top cover.
3. Remove the metal top cover.

4.1.2 Panel Overview

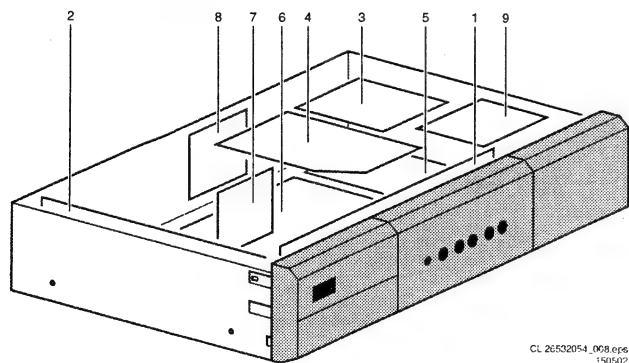


Figure 4-2 Panel overview

1. Front I/O.
2. Power Supply.
3. Double Window Panel (if present).
4. Feature Box.
5. Small Signal Panel.
6. Audio Video Interface.
7. Down Scaler panel (if present).
8. High Definition panel.
9. 3D Comb panel (US version only).

4.2 Service Positions and Panel Removal

4.2.1 Front I/O Panel

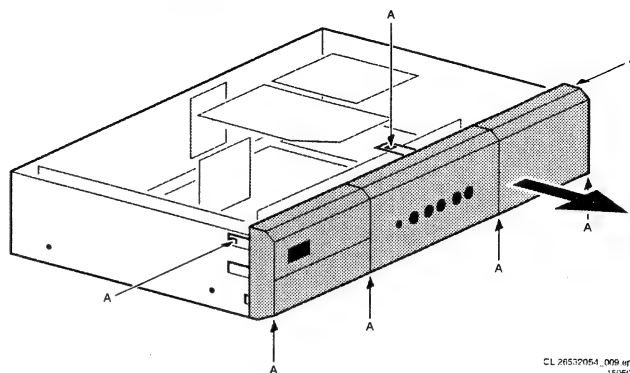


Figure 4-3 Front cover removal

Remove the front cover plate:

1. Pull the lugs [A] on top, bottom, and both sides of the receiver box slightly aside.
2. Pull the front panel in the direction of the big arrow.

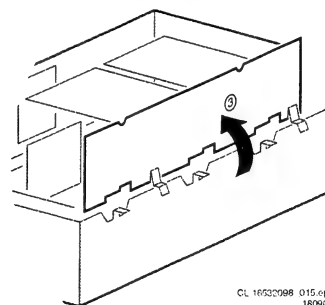
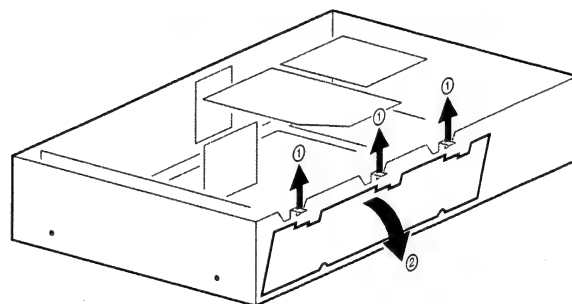


Figure 4-4 Service position Front I/O panel

Remove the front I/O panel:

1. Lift the clamps [1] to release the Front I/O panel.
2. Unlock the Front I/O panel from the receiver box [2].
3. Park the front I/O panel on top of the housing [3]. Use a protection sheet to prevent short-circuiting.

Note: Be sure to keep track of the three copper grounding clips; they can be lost very easily, or they can cause short circuiting when falling into the receiver box.

4.2.2 Power Supply Panel

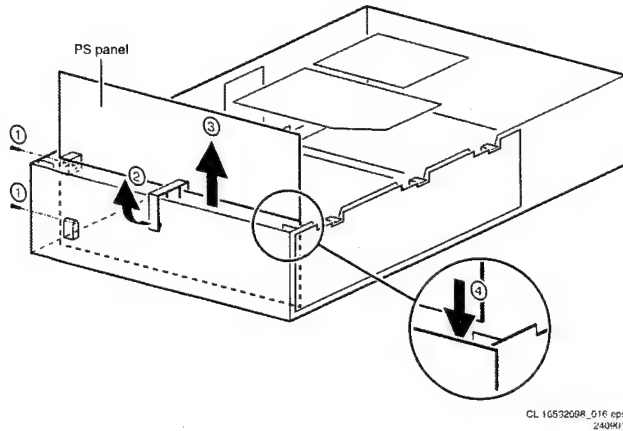


Figure 4-5 Service position Power Supply (PS)

1. Remove the front panel, if it was not yet removed.
2. Remove the screws [1].
3. Remove the fixation bracket [2].
4. Pull the Power Supply panel out of the receiver box [3].
5. Place the Power Supply panel in the small slots on the edges of the top of the housing [4].

Warning: Be aware of the live voltages on this board during operation!

4.2.3 Double Window Panel (if present)

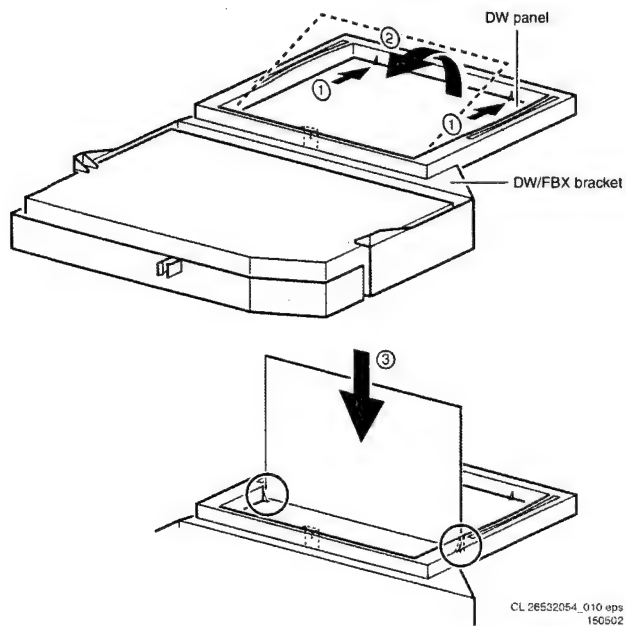


Figure 4-6 Service position Double Window panel

When the metal top cover is removed, the Double Window panel is accessible.

For the service position:

1. Release the clamps [1] and push the panel gently up and out of its bracket [2].
2. One of the cables must be temporarily disconnected to place the Double Window panel in its service position as shown in the figure.
3. Lead the removed cable in a favourable position and connect this cable again.

4.2.4 Feature Box module

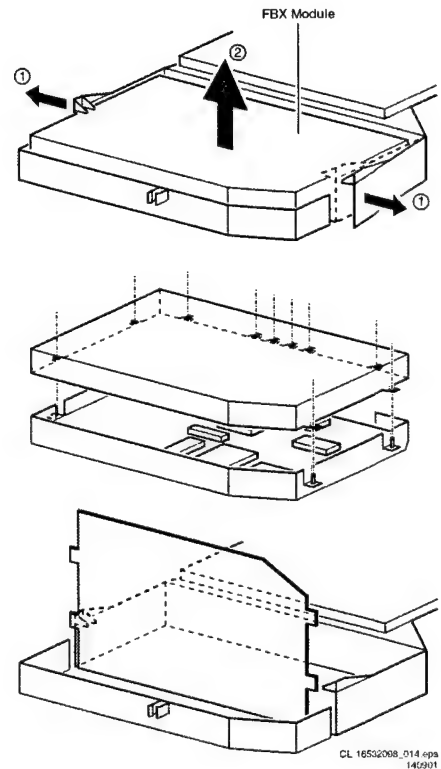


Figure 4-7 Service position Feature Box panel (FBX)

1. Pull the clamps aside [1], and lift the Feature box module [2].
2. Disconnect the cables and take out the module.
3. Remove the shielding of the module: de-solder the fixation lugs.
4. Remove the Feature Box panel from the module.
5. Connect the cables and place the Feature Box panel in service position in the regarding bracket.

4.2.5 Small Signal Panel

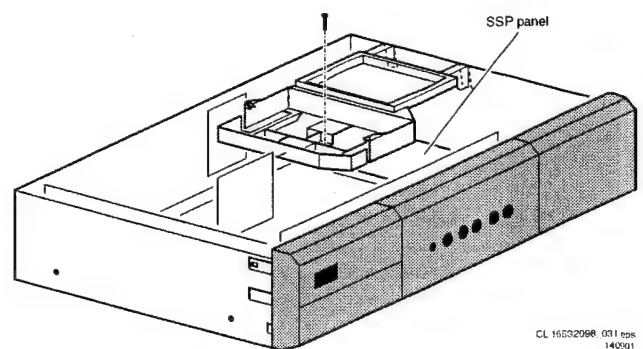


Figure 4-8 Removal of the Feature Box bracket

1. Release the clamps that secure the feature box module.
2. Lift the feature box module, disconnect the regarding cables and take out the module.
3. Release the side clamps that secure the Feature box bracket.
4. Remove the screw in the middle of the feature box position and remove the complete bracket.

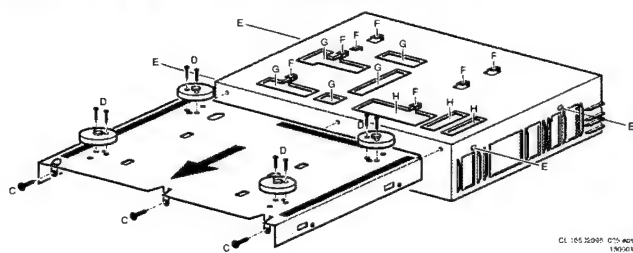


Figure 4-9 Removal of the bottom cover plate

To access the **copper side** of the Small Signal Panel, it is necessary to remove the metal bottom cover:

1. Turn the TV receiver box upside down.
2. Remove the three screws [C] that secure the bottom plate at rear side.
3. Remove the screws [D] that hold the four feet and remove the feet.
4. Pull the metal bottom cover backwards (lift it over the studs [E]). Be aware of the hooks [F] on the frame.

Remove the Small Signal Panel:

1. Disconnect all cables.
2. Remove at rear side of the receiver box the three mounting screws that secure this panel to the back plate.
3. Release the clamps that secure the Small Signal Panel and carefully take it out.

4.2.6 Audio Video Interface panel

If the metal bottom cover is removed, the copper side of the AVI panel is accessible.

Remove the Audio Video Interface panel

1. Make sure that the Feature Box module and its bracket is removed as described above.
2. Disconnect all cables.
3. Remove at rear side of the TV receiver box the three mounting screws that secure this panel to the backside.
4. Remove the four distance stud screws belonging to the PC/MAC IN and MONITOR OUT sockets.
5. Release the clamps that secure the Audio video interface and carefully take out the Small Signal Panel.

4.2.7 Down Scaler Panel (if present)

1. This Down Scaler panel stands normally in an upright service position.
2. To remove this panel: pull it firmly out of its connectors, mounted on the Audio Video Interface.

Note: Be sure to keep track of the two copper grounding clips; they can be lost very easily, or they can cause short circuiting when falling into the receiver box.

4.2.8 HD/SD (High/Standard Definition) Panel

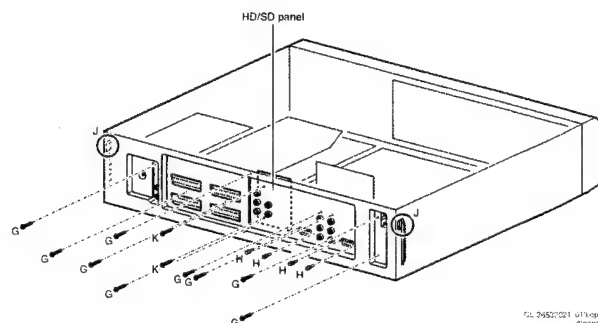


Figure 4-10 Removal of the HD/SD connector panel

There is no service position defined for this panel. The best way to perform measurements on this panel is to remove the Feature Box bracket as described above. Then the component side of this single sided panel is accessible.

To remove the HD/SD panel:

Unscrew the screws that hold the panel (on the inside of the TV receiver).

4.2.9 3D Comb panel (US only)

1. Remove both mounting screws
2. Turn it in a favourable position and lift it (if necessary release and lift the Feature Box bracket a fraction at right side).
3. Release the cable from the special shaped cable clamp.

Note: Use a protection sheet to prevent short-circuiting if you place the unit in service position.

1. If necessary, you can remove the panel from its bracket. To do this, release the clamps that secure the panel in the bracket and remove the panel out of the bracket.

4.3 Reassembly

- To re-assemble the TV receiver, perform the disassembly processes in reversed order.
- Before re-placing the top cover, verify the correct connections for all the cables, and lead the cables in the original positions.

5. Service Modes, Error Codes, and Fault Finding

Index of this section:

1. Test Points
2. Service Modes
3. Problems and Problem Solving Tips (related to CSM).
4. ComPair
5. Error Codes
6. Protections
7. Repair Tips

5.1 Test Points

5.1.1 General

Perform measurements under the following conditions:

- Set in Service Default Mode.
- Video: Colour bar signal, received via the internal tuner.
- Audio: 3 kHz left, 1 kHz right.

Exceptions (when using external sources):

- Set in Service Default Mode (SDM).
- Video: If using a DVD player, use a "live" picture. If using a VGA source, use a picture of your choosing.
- Audio: You can use a service generator, or the audio from the DVD player or VGA source.

5.1.2 Waveforms

The chassis is equipped with test points printed on the circuit board assemblies. Test points are displayed in two different ways:

- The old method, still in use for re-used circuits (like the Small Signal Panel, the Double Window Panel, and the Feature Box), refers to the functional blocks. The test points have names starting with I for IF, S for sound, etc. The numbering is in a logical sequence for diagnostics.
- The new method, used for new circuits, uses service test points that are recognizable as tagged Fxxx points. With this method, factory test points are published (F-points are functional test points, I-points are test points for in-circuit testers in the factory. All these test points are on the copper side. When the test point is a service test point, it is tagged for recognition.

Not all test points have been measured, but they can serve as identification names in Service communication (for example, ComPair fault find trees, Searchman files).

In the following cases, there will also be no waveform:

- When a Vdc voltage is displayed in the diagrams, or when the waveform does not have an additional value.
- When the sources are not easily accessible for the Service engineer (for example, VGA source).
- External AV inputs are not measured, since the waveform is equal to the source (dependent of load resistor matching).

5.1.3 DC voltages

The DC voltages are measured at practically all semiconductor pins. These values are displayed in the circuit diagrams. If a DC value is displayed between brackets then this value is measured in "standby" mode.

Note: DC voltages are also measured on the connectors.

5.2 Service Modes

Service Default Mode (SDM) and Service Alignment Mode (SAM) offer several features for the service technician, while the Customer Service Mode (CSM) is used for communication between the servicer and the customer.

There is also the option of using ComPair, a hardware interface between a computer (see requirements) and the FTV chassis. It offers the ability of structured troubleshooting, a test pattern generation, error code reading, software version readout, and software upgrading. (Software upgrading is not available for all chassis)

Minimum requirements for ComPair: a Pentium Processor, Windows 9x/NT/2000/XP/ME, and a CD-ROM drive (see "ComPair" section).

5.2.1 Service Default Mode (SDM)

Purpose

- To create a pre-defined setting to get the same measurement results as given in this manual.
- To override SW protections (only when SDM is entered via the "service pins" on SSP connector 0356).
- To start the "blinking LED" procedure.

Specifications

- Tuning frequency: 475.25 MHz for PAL/SECAM (the source is displayed on the screen)
- Colour system: SECAM L for France and PAL B/G for the rest of Europe.
- All picture settings at 50 % (brightness, colour, contrast).
- Bass, treble and balance at 50 %; volume at 25 %.
- All service-unfriendly modes (if present) are disabled. The service unfriendly modes include:
 - Sleep timer.
 - Smart modes.
 - On Timer.
 - Child lock.
 - Black mute.

How to enter SDM

To enter SDM, use one of the following methods:

- Press the following key sequence on the remote control transmitter: **062596** directly followed by **MENU**.
- Short pins 2 and 3 on connector 0356 of the SSP (the two pins that are nearest to the rear panel) while the set is in the normal operation mode.

Caution: Entering SDM by this method will override all processor-controlled protections. When doing this, the service technician must know exactly what he is doing, as this could damage the set.

- Use the Dealer Service Tool (DST) emulation feature of ComPair.

After entering SDM, a blank screen is visible, with "Service Default" in the upper part for recognition. The "blinking LED" procedure is started and will indicate any possible errors via the front LED.

How to navigate in SDM

To toggle to the SAM mode, press the following key sequence on the remote control transmitter: **062596** directly followed by **OSD (i+)**.

How to exit SDM

Switch the set to STANDBY by pressing the POWER button on the remote control transmitter (if you switch the set OFF by disconnecting the mains cable, the set will remain in SDM when mains is reapplied).

5.2.2 Service Alignment Mode (SAM)

Purpose

- To perform (software) alignments.
- To change the option settings.
- Easy identification of the software version.
- To view operational hours.
- To display (or clear) the error code buffer.
- To give the service technician the possibility (through a special sequence of navigating and selecting) to diagnose F21R problems with a standard PC monitor.

Specifications

- Software version of main processor.
- Operational hours counter.
- Dealer options.
- Service options.
- Error buffer reading and erasing.
- Alignments.
- Functional test.

How to enter SAM

Use one of the following methods:

- Press the following key sequence on the remote control transmitter: **062596** directly followed by **OSD (i+)**.
- Short jumpers 1 and 2 of connector 0356 on the SSP (the two pins that are nearest to the front panel).
- Use the "Align" key of the Dealer Service Tool (DST) emulation feature of ComPair.

After entering SAM, the following screen is visible:

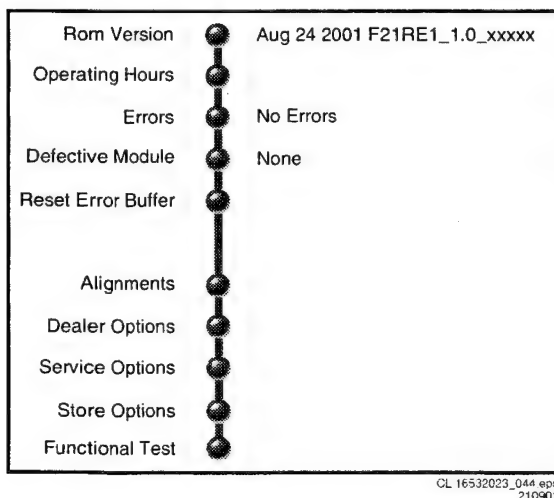


Figure 5-1 SAM screen shot

- **OPERATION HOURS.** The accumulated total of operation hours of the Receiver box. Every time the Receiver box is switched "on", 0.5 hour is added to the operation hours counter.
- **HARDWARE INFO.** Indicates the software date and version (MMDDYY AAAABC_X.Y_xxxxx) of the box.
 - MMDDYY = software date
 - AAAA = the chassis name.
 - B = the region (E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM or G= Global).
 - C = the language cluster (1= English).
 - X = the main software version number.
 - Y = the sub software version number.
 - xxxxx = the last five digits of the 12nc code.
- **ERRORS.** Room for a maximum of 10 errors. The most recent error is displayed at the upper left position. For an explanation of the errors, see the error code table in the "Error Codes" section.
- **DEFECTIVE MODULE.** The module that generates an error is displayed here. If there are multiple errors in the

buffer that have not all been generated by a single module, there is probably another defect. In that situation, the message "Unknown" will then be displayed here. If there are no errors, "None" is displayed.

- **RESET ERROR BUFFER.** Erases the contents of the error buffer. Press "OK" on the remote control transmitter to do this; the error buffer is cleared.
- **ALIGNMENTS.** Navigation by sub menus to service alignment items. The details of these alignments are explained in the "Electrical Alignments" section.
- **DEALER OPTIONS.** Controls the demonstration modes used by dealers for display purposes.
- **SERVICE OPTIONS.** In this sub menu, the options can be set. The quickest method to do this is through HW option number entry.
- **STORE OPTIONS.** Service options must be stored here. **Note:** Without storing, no changes made to the options will be recorded. The servicer must remember to store all changes before exiting SAM for those changes to take effect.
- **FUNCTIONAL TEST.** Activate this test by pressing the "OK" key on the remote control transmitter. Eventual errors are displayed in the error buffer. The error buffer is **not** erased, although it looks that way. By exiting SAM and then entering SAM again, you will see the error buffer still contains the previous contents.

How to navigate in SAM

Use one of the following methods:

- In SAM, select menu items with the "Cursor Up/Down" keys on the remote control transmitter. The selected "ball" item is highlighted and becomes a "puck" (blue becomes yellow). When not all menu items fit on the screen, this is shown by two "ball" figures overlapping. Use the "Cursor Up/Down" keys to display the next / previous menu item(s).
- With the "Cursor Left/Right" keys, it is possible to:
 - (De)activate the selected menu item.
 - Change the parameter of the selected menu item (some times through a "slider" entry)
 - Activate the selected submenu.
- To toggle to the SDM mode, press the following key sequence on the remote control transmitter: 062596 directly followed by MENU.

Note: SAM is exited when the MENU button on the remote control transmitter is pressed once. If SAM is exited accidentally, you have to enter the SAM mode again to perform SAM alignments and adjustments.

How to exit SAM

To exit SAM, press the MENU button on the remote control transmitter once.

5.2.3 Customer Service Mode (CSM)

Purpose

The Customer Service Mode shows error codes and information on the Flat TV operation settings. The servicer can instruct the customer to enter CSM by telephone and read off the information displayed. This helps the servicer to diagnose problems and failures in the Flat TV set before making a service call.

The CSM is a read-only mode; therefore, modifications are not possible in this mode.

How to enter CSM

To enter CSM, use one of the following methods:

- Press the MUTE button on the remote control transmitter and the MENU button on the local keyboard simultaneously for at least four seconds.
- An alternative CSM entry method is to press the following key sequence on the remote control transmitter: **123654**.

Do not allow the display to time out between entries while keying the sequence. The disadvantage of this method is that the selected source is changed, due to the key sequence. Therefore, the first method is preferred.

Upon entering the Customer Service Mode, the following screen will appear:

Customer Service Menu 1

- **SET TYPE.** This allows the customer to view the (commercial) type number of the Receiver box, without looking at the bottom of this box. This information can be very helpful when talking with the service technician.
- **AG NBR.** First some explanation for understanding. On the type plate of the E-box (bottom), you can see a PROD. NO: AG-code (e.g. AG000312 xxxxxx): AG00 is a production code, 0312 means production year 2003, week 12 and xxxxxx is the series number of the set. On this screen line, you can read the AG-code of the Receiver box, without looking at the bottom of the E-box. This information can be very helpful when talking with a dealer or Philips Customer Care Centre (P3C). Currently this line is not filled in. At the moment, you will see: **0000.... It will be implemented in the future.
- **SW VERSION.** Indicates the software version (AAAAABC_X.Y_xxxxx) of the box.
 - AAAA = the chassis name.
 - B = the region (E= Europe, A= Asia Pacific, U= NAFTA, L= LATAM or G= Global).
 - C = the language cluster (1= English).
 - X = the main software version number.
 - Y = the sub software version number.
 - xxxxx = the last five digits of the 12nc code.
- **FEATUREBOX.** Gives the 12nc of the used Feature Box software.
- **CODE 1.** Gives the last five errors of the error buffer. As soon as the built-in diagnosis software has detected an error, the buffer is adapted. If there are no errors, the text "0" is displayed.
- **CODE 2.** Gives the first five errors of the error buffer. As soon as the built-in diagnosis software has detected an error, the buffer is adapted. The most recent error is displayed on the leftmost position of the Code 2 line. Each error code is displayed as a 3-digit number. When less than 10 errors occur, the rest of the line(s) is (are) empty. If there are no errors, the text "0" is displayed. See the "Error Codes" section for a description of the error codes. **Service Tip:** When a group of adjacent errors has a specific colour, this means they have occurred in the same time window. This gives service technicians additional information.
- **VOLUME.** Shows the last status of the volume, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). Volume parameters can be changed by using the volume key on the remote control transmitter. **Note:** For "speaker less" TV monitors, this item is not shown.
- **BRIGHTNESS.** Gives the last status of the brightness, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). The brightness parameter can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "picture" and setting "brightness".
- **CONTRAST.** Gives the last status of the contrast, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). Contrast parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "picture" and setting "contrast".
- **COLOUR.** Gives the last status of the colour saturation, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). Colour parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after

pressing the "menu" button and navigating to "picture" and setting "colour".

- **HUE.** Gives the last status of the colour saturation, as set by the customer. The parameter can vary from -50 (minimum) to 50 (maximum). Hue parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "picture" and setting "hue".

You can select the next Customer Service Mode screen(s) by pressing the CURSOR DOWN key on the remote control transmitter. To return to the previous Customer Service Mode screen(s), press the CURSOR UP key on the remote control transmitter (there are 4 CSM menu screens).

Customer Service Mode Screen 2

- **SHARPNESS.** Gives the sharpness parameter, as set by the user. It can vary from 0 (minimum) to 7 (maximum). A noisy picture may result if there is a bad antenna signal, or the parameter of sharpness is set too high. Sharpness parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "picture" and setting "sharpness".
- **HEADPHONE VOLUME.** Gives the last status of the headphone volume, as set by the customer. The parameter can vary from 0 (minimum) to 100 (maximum). Headphone volume parameters can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "sound" and setting "headphone volume".
- **CENTRE MODE.** Indicates the loudspeaker configuration of the monitor. If it is set to "On", then the internal speakers both produce centre sound (from the "centre input" input jack on the back of the set). If it is set to "Off", the speakers produce left and right sound. This parameter can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "Settings", "General" and choosing "Centre mode" = "On". **Note:** For "speaker less" TV monitors, this item is not shown.
- **SOUND MODE.** Indicates the selected sound mode, as selected by the customer. This can be "Stereo", or "Mono". This parameter can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "Settings", "General" and choosing "Sound mode".
- **TUNER FREQUENCY.** Gives the frequency of the main Tuner in MHz.
- **INCREDIBLE SURROUND.** Indicates the by the customer selected surround mode. This can be 'On' or 'Off'. **Note:** For "speaker less" TV monitors, this item is not shown.
- **DIGITAL NATURAL.** Indicates the, by the customer selected, Digital Natural Motion mode. This can be 'On' or 'Off'. This parameter can be changed via the 'cursor left' and 'cursor right' keys on the remote control handset after pressing the 'menu'-key and navigating to 'Menu', 'Picture' and choosing 'Dig natural motion'.
- **TV SYSTEM.** Gives information about the video system of the selected transmitter.
 - BG: PAL BG signal received
 - DK: PAL DK signal received
 - I: PAL I signal received
 - L/La: SECAM L/L' signals received
 - M38.9: NTSC M signal received with video carrier on 38.9 MHz
 - MN: NTSC M signal received

Customer Service Mode Screen 3

- **BALANCE.** Gives the last status of the balance, as set by the customer. The parameter can vary from -50 (maximum left balance) to 50 (maximum right balance). Balance parameters can be changed by using the CURSOR LEFT

and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "sound" and setting "balance".

- **DNR.** This is the setting of Dynamic Noise Reduction. This can be set to "Off", "minimum", "medium", or "maximum".
- **NOISE FIGURE.** Gives the selected noise ratio for the selected transmitter. This parameter can vary from 0 (good signal) to 255 (bad signal).

Note: This measured value only has significance when the "active control" mode is activated (this can be done by pressing the "active control" key on your remote control transmitter).

- **SOURCE.** This source parameter can be changed by using the CURSOR LEFT and CURSOR RIGHT keys on the remote control transmitter after pressing the "menu" button and navigating to "Menu", "Setup", and choosing "Source". The "quality" parameter depends how you connect your source: for example, if you connected the source to the Video input or to the SVHS input. This can be set to
 - Tuner (default)
 - EXT1.
 - EXT2.
 - EXT3.
 - EXT4.
 - EXT5.
 - Front.
 - VGA. Behind this source value there is an item referring to the "quality" of the chosen source:
 - Tuner (default)
 - VIDEO/STEREO.
 - VIDEO/NICAM.
 - S-VIDEO/STEREO.
 - S-VIDEO/NICAM.
 - RGB/STEREO.
 - YUV/STEREO.
 - YPBPR 1FH/STEREO.
- **AUDIO SYSTEM.** Gives information about the audio system of the selected transmitter.
 - Analog Mono.
 - Analog Stereo.
 - PCM 2/0.
 - DD: 1/0, 2/0 LfRt, 2/0 L0R0, 2/1, 2/2, 3/0, 3/1, 3/2, or 1+1.
 - MPEG: 1/0, 2/0, 2/0 LfRt, 2/1, 2/2, 3/0, 3/1, 3/2, 1+1, 2+2.
- **TUNED BIT.** Gives information about the tuning method of the stored preset.
 - If a channel is detected by searching (manual as well as automatic installation), the micro-search tuning algorithm is used. When a channel is identified and stored, this will display YES.
 - When you install a preset (while the channel is not being broadcast) with "digit entry"/"fine tune", the display (after storing) will read NO. If the channel is found later (after a successful micro-search), the tuned bit will change to "Yes". If the tuned bit displays "No", something is wrong with the installed preset. Please reinstall the preset.

Customer Service Mode 4

- **ON TIMER.** Gives information about the timer settings. This can be:
 - Off.
 - On.
 - Time (e.g. 18.25).
 - Day (e.g. Monday).
 - Program Number (e.g. PR23).
- **PRESET LOCK.** Gives the status info. This can be:
 - Unlock.
 - Locked.
- **CHILD LOCK.** Gives the status info. This can be:
 - Unlock.
 - Locked.
 - Custom.
- **AGE LOCK.** Gives the status info. This can be:

- Off.
- 4, 6, 8, 10, 12, 14, or 16 years.
- **LOCK AFTER.** Gives the status info. This can be:
 - Off.
 - Time (e.g. 18.45).
- **CATEGORY LOCK.** Gives the status info. This can be:
 - Off
 - Movies, News, Shows, Sports, Children, Music, or Culture.
- **PROGRAM CATEGORY.** Gives the status info. This can be:
 - Off
 - Movies, News, Shows, Sports, Children, Music, or Culture.
- **SW CODE 1.** This code is only for Development. Do not use it.
- **SW CODE 2.** This code is only for Development. Do not use it.

5.3 Problems and Solving Tips (Related to CSM)

5.3.1 Picture Problems

Note: The problems described below are related to the TV settings (customer settings). The procedures to change the parameters (or status) of the different settings are described.

Snowy/noisy picture

Check the NOISE FIGURE line. If the value is 127 or higher and is also high on other programs, check the aerial cable/ aerial system.

Picture too dark

- Press the "Smart Picture" button on the remote control transmitter. If the picture improves, increase the brightness value or increase the contrast value. The new value(s) are automatically stored for all TV channels.
- If the picture improves after entering CSM, increase the brightness value or increase the contrast value. The new value(s) are automatically stored for all TV channels.
- Check the BRIGHTNESS and CONTRAST lines. If the value of BRIGHTNESS is low (<15) or the value of CONTRAST is low (<15), increase the brightness value or increase the contrast value.

Picture too bright

- Press the "Smart Picture" button on the remote control transmitter. If the picture improves, reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
- If the picture improves after entering CSM, reduce the brightness value or reduce the contrast value. The new value(s) are automatically stored for all TV channels.
- Check BRIGHTNESS and CONTRAST. If the value of BRIGHTNESS is high (>60) or the value of CONTRAST is high (>75), reduce the brightness value or increase the contrast value.

Fading picture

Digital scan effect. Check the DNR line. The status of DNR is a value between 0 and 100. There is no practical way to explain the significance of this value. If the picture is fading, adjustment of the DNR level may help. The DNR level can be adjusted by the following navigation route: "Menu" - "Picture" - "DNR". There are four different selectable levels.

White line around picture elements and text

- Press the "Smart Picture" button on the remote control transmitter. If the picture improves, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.

- If the picture improves after entering CSM, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.
- Check the SHARPNESS line. If the value is too high, reduce the sharpness value. The new value(s) are automatically stored for all TV channels.

Black picture and/or unstable picture

Improper signal is being received. Check the NOISE FIGURE line. If the value is higher than 127, the signal is suspect. Check your cable or aerial signal.

Black and white picture

Check the COLOUR line. If this value is low (<30), increase the "Colour" value. The new value(s) are automatically stored for all TV channels.

Menu text not sharp enough

- Press the "Smart Picture" button on the remote control transmitter. If the picture improves, reduce the contrast value. The new value(s) are automatically stored for all TV channels.
- If the picture improves after entering CSM, reduce the contrast value. The new value(s) are automatically stored for all TV channels.
- Check the CONTRAST line. If this value is high (>75), reduce the contrast value.

5.3.2 Sound problems (only with 'speakered' FTV-monitor connected)

No sound from left and right speaker.

Possible solutions:

- Press the "Smart Sound" button on the remote control transmitter. If the sound improves, raise the volume value. The new value(s) are automatically stored for all TV channels.
- If the volume is acceptable after entering CSM, increase the volume. The new value(s) are automatically stored for all TV channels.
- Check the VOLUME line. If the value is low, increase the "Volume" value. The new value(s) are automatically stored for all TV channels.

Sound too loud from left and right speaker.

- Press the "Smart Sound" button on the remote control transmitter. If the sound improves, reduce the volume value. The new value(s) are automatically stored for all TV channels.
- If the volume is acceptable after entering CSM, decrease the volume. The new value(s) are automatically stored for all TV channels.
- Check the VOLUME line. If the value is high, reduce the "Volume" value. The new value(s) are automatically stored for all TV channels.

5.4 ComPair

5.4.1 Introduction

ComPair (Computer Aided Repair) is a service tool for Philips Consumer Electronics products. ComPair is a further development of the DST (special remote control transmitter for service), which allows faster and more accurate diagnostics. ComPair has three big advantages: ComPair helps you to quickly get an understanding on how to repair the chassis in a short time by guiding you systematically through the repair procedures. ComPair allows very detailed diagnostics (on I2C level) and is therefore capable of accurately indicating problem areas. You do not have to know anything about I2C commands yourself because ComPair takes care of this.

ComPair speeds up the repair time since it can automatically communicate with the chassis (when the microprocessor is working) and all repair information is directly available. When ComPair is installed together with the Force electronic manual of the chassis being serviced, schematics and PWBs are only a mouse click away.

5.4.2 Specifications

ComPair consists of a Windows based faultfinding program and an interface box between PC and the product. The ComPair interface box is connected to the PC via a serial or RS232 cable.

With the F21R Receiver box, the ComPair interface box and the Receiver box communicate via a bi-directional infrared link.

The ComPair faultfinding program is able to detect and diagnose problems occurring in the product. ComPair can gather diagnostic information in two ways:

- **Automatic** (by communication with the Receiver box): ComPair can automatically read out the contents of the entire error buffer. Diagnosis is done on I2C level. ComPair can access the I2C bus of the Receiver box. ComPair can send and receive I2C commands to the microprocessor of the Receiver box. In this way, it is possible for ComPair to communicate (read and write) to devices on the I2C busses of the Receiver box.
- **Manually** (by asking questions to you): Automatic diagnosis is only possible if the microprocessor of the Receiver box is working correctly, and only to a certain extent. When this is not the case, ComPair will guide you through the faultfinding tree by asking you questions (for example, *Does the screen give a picture? Click on the correct answer: YES / NO*), and showing you examples (for example, *Measure test point 17 and click on the oscilloscope you see on the oscilloscope*). The servicer can answer by clicking on a link (for example, text or a waveform picture) that will bring you to the next step in the faultfinding process.

By a combination of automatic diagnostics and an interactive question and answer procedure, ComPair will enable you to find most problems in a fast and effective way.

Beside fault finding, ComPair provides some **additional features** like:

- Uploading or downloading of presets.
- Management of preset lists.
- Emulation of the Dealer Service Tool (DST).
- If both ComPair and the Force electronic service manual are installed, all the schematics and the PWBs of the product are available by clicking on the appropriate hyperlink.

Example: Measure the DC-voltage on capacitor C2568 (Schematic/Panel) at the SSP.

- Click on the "Panel" hyperlink to automatically show the PWB with a highlighted capacitor C2568.
- Click on the "Schematic" hyperlink to automatically show the electronic position of the highlighted capacitor.

5.4.3 How to Connect ComPair

1. First, install the ComPair Browser software on your PC (read the installation instructions carefully).
2. Connect the RS232 interface cable between a free serial (COM) port of your PC and the PC connector (marked "PC") of the ComPair interface.
3. Connect the mains adapter to the supply connector (marked "POWER 9V DC") on the ComPair interface.
4. Switch the ComPair interface OFF.
5. Switch the Receiver box OFF (and remove the mains).
6. Point the ComPair interface to the Service send-LED (behind the cover) on the front of the Receiver box.

7. Plug the mains adapter in an mains outlet and switch on the ComPair interface. The green and red LEDs light up together. The red LED turns off after approximately 1 second, while the green LED remains lit.
8. Start the ComPair program and read the "introduction" chapter.

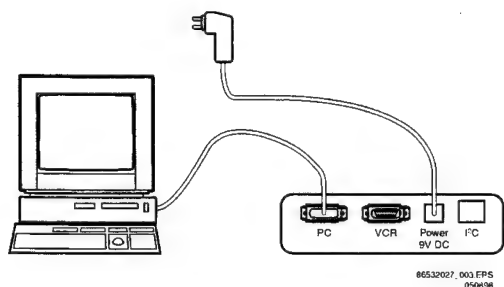


Figure 5-2 ComPair set-up

5.4.4 How to Order

ComPair order codes (EU/AP):

- Starter kit ComPair32/SearchMan32 software and ComPair interface (excl. transformer): 3122 785 90450.
- ComPair interface (excluding transformer): 4822 727 21631.
- Starter kit ComPair32 software (registration version): 3122 785 60040.
- Starter kit SearchMan32 software: 3122 785 60050.
- ComPair32 CD (update): 3122 785 60070.
- SearchMan32 CD (update): 3122 785 60080.
- ComPair interface cable: 3122 785 90004.

5.4.5 Stepwise Start-up / Shut-down

Under normal circumstances, a fault in the power supply, or an error during start-up, will switch the television to protection mode. ComPair can take over the initialisation of the television. In this way, it is possible to distinguish which part of the start-up routine (hence which circuitry) is causing the problem.

Stepwise start-up explanation

This is realised via ComPair and is very helpful when a **protection** is activated (see also paragraph "Protections").

Table 5-1 Stepwise Start-Up Table

State	Mode description	Display LEDs(*)	Enabled protections
0	- Low power standby. - uP in Standby.	Red 'on'	None
1	- High power standby. - TV-set in standby.	RedFlash 1 time	None
2	- Supply 'on'. - Protections 5V2 and 8V6 activated.	Orange/ GreenFlash 2 times	67 and 68
3	- Sound ICs initialised. - Protections FBX and TUNER activated.	Orange/ GreenFlash 3 times	Plus 77 and 80
4	Not used in FTV		
5	- TV operates. - Unblanked picture.	Orange/ GreenFlash 5 times	

Stepwise shutdown explanation

In the stepwise shutdown mode, state 2 and 4 are skipped.

Table 5-2 Stepwise Shut-Down Table

State	Mode description	Display LEDs(*)	Disabled protections
5	- TV operates. - Unblanked picture.	Orange/ GreenFlash 5 times	-
4	- All protections are 'on'.	Orange/ GreenFlash 4 times	-
3	- Sound ICs initialised. - All protections 'off'.	Orange/ GreenFlash 3 times	-
1	- High power standby. - TV-set in standby.	Red 0.5 Hz- Flash 1 time	80, 77, 68, and 67
0	- Low power standby. - uP in Standby.	Red 'on'	-

Note (*): When the set is in stepwise mode and, due to stepping-up, a protection is activated; the set will really go into protection (blinking LED). The set will not leave the stepwise-mode however. By stepping down, the set can be activated again, until state X where the protection was activated. At state (X-1) diagnostic measurements can be performed.

5.5 Error Codes

The error code buffer contains all detected errors since the last time the buffer was erased. The buffer is written from left to right. When an error occurs that is not yet in the error code buffer, it is written at the left side and all other errors shift one position to the right.

5.5.1 How to Read the Error Buffer

It is possible to read out the error buffer in three ways:

- On the screen while in Service Alignment Mode (SAM). If there is a picture, this is the easiest way to read the error buffer. In the SAM main menu, the last 10 error codes, which have occurred, are displayed. The most recently detected error code is displayed on the left side. Examples:
 - 003 000 000 000 000: error code 3 is the last and only detected error.
 - 002 003 000 000 000: error code 3 was detected first and error code 2 is the last detected (newest) error.
- With the CODE 1 and CODE 2 lines in CSM.
- With ComPair.

5.5.2 How to Clear the Error Buffer

It is possible to clear the error buffer in two ways:

- By selecting the item "reset Error Buffer" in the SAM main menu.
- By pressing the following key sequence on the remote control transmitter: **MUTE - 062599 - OK**.

Note: When the error buffer is full (10 codes), no new errors can be stored. The set monitors how long every error is stored in the error buffer. If a false error is in the buffer, it will be deleted after 50 hours. If an actual error is in the error buffer, it will be written to the buffer again after 50 hours. This is a safeguard to ensure that the history of the error codes is stored. To help ensure that you are not reading false error codes, you may want to record the contents of the error buffer, reset the buffer, and see which error codes are generated again by the set.

5.5.3 Error Codes

If the set has non-intermittent faults, clear the error buffer before you begin the repair. This to ensure that old error codes are no longer present.

If possible, check the entire contents of the error buffer. In some situations, an error code is only the result of another error code and not the actual cause of the problem (for example, a fault in the protection detection circuitry can lead to a protection).

Table 5-3 Error Code Overview

Error	Device	Description	Defective item	Diagram	Defective module indication
2	ST24E32 or M24C32	Non volatile memory	IC7008	K7	Control
3	SAA580x	OTC2.5 microprocessor/TXT	IC7003	K7	Control
5	UV1316	Tuner	U1102	K1	Tuner
10	TEA6415	I/O source select video	IC7208	K8	Source select
11	TEA6422	I/O source select audio	IC7777	K8	Source select
15	TDA9320	HIP I/O-video processing	IC7501	K1	Chroma IF IO
20	TDA9330	HOP video control/deflection processor	IC7300	K6	Video Controller
21	TDA9178 (if present)	LTP Peaking (TOPIC)	IC7402	K6	Video Controller
23	UPD64083 (if present)	3D Comb IC	IC7023	C0	3D Comb Filter
25	MSP34xxx	ITT sound processor	IC7751	K3	Audio Module
27	PCF8574	I/O Expander	IC7880	AV8	AV-Interface
30	TEA6415	Video Selection Switch	IC7710	AV7	AV-Interface
31	TEA6422	Audio Selection Switch	IC7810	AV8	AV-Interface
33	ACEX-EPLD	HD signal/sync processing	IC7360	AV3	AV Interface
35	UV1316 (if present)	FDS Tuner	U1102	M1	Video Dual Screen Panel
36	PCF8574 (if present)	FDS I/O Expander	IC7860	M2	Video Dual Screen Panel
37	SAB9079 (if present)	FDS Popov	IC7700	M4	Video Dual Screen Panel
38	TDA9320 (if present)	FDS HIP2	IC7501	M1	Video Dual Screen Panel
39	M24C04 (if present)	FDS NVM	IC7991	M1	Video Dual Screen Panel
41	TDA7309 (if present)	FDS Headphone	IC7620	M5	Video Dual Screen Panel
50	SAA4978	FBX Picnic	IC7611	L1	Feature Box
52	T8F24EF (if present)	FBX Eagle	IC7724	L2	Feature Box
53	SAA4992	FBX Falconic	IC7626	L3	Feature Box
65	Slow I2C bus blocked		See block diagram	Slow I2C Blocked	
66	Fast I2C bus blocked		See block diagram	Fast I2C Blocked	
67	Supply 5V	5V2	See block diagram	+5V Supply	
68	Supply 8V	8V6	See block diagram	+8V Supply	
77	Featurebox protection	FBX prot.			+3V FBX Supply
80	Tuner protection	Tuner prot.	U1102	K1	+8V Tuner Supply
81	UPD64083 (if present)	3D Comb prot.	IC7023	C0	3D Comb Filter

5.6 Protections

The microprocessor (OTC) of the F21R Receiver box remains active during standby. This because power of the microprocessor (and the attached memory chip set) is coming from the 3V3 supply, which is derived from the 5V Standby circuitry.

Therefore, in both "Power on" as in "Standby" mode, the microprocessor is connected to this power supply. The microprocessor controls the "Standby" line for switching "on" and "off" the main supply. In the standby mode, or in the protection mode, the "Standby" line will open the contacts of relay 1400 (diagram PS) via T7401, which results in switching "off" the mains input to the main supply.

We can divide the chassis protections in two groups:

1. I2C protections: from I2C-busses (fast and slow) or I2C-IC errors (device errors).

2. OTC input protections.

5.6.1 I2C Protections

During normal operation, some registers of the I2C controlled ICs are refreshed every 200 milliseconds. During this sequence, the three I2C busses and the I2C ICs will also be checked.

Possible protections:

- **I2C bus protections.** This will take place if the SDA and SCL are short-circuited to ground or to each other.
- **I2C device protections.** This can occur when there is a malfunction in the communication with one specific device, or if the power supply of the device is missing.
- **FBX and/or Tuner circuitry protection.** If one of these circuits does not respond for more than 1 second

(measured via I2C), the Receiver box goes into protection mode.

5.6.2 OTC Input Protections

If a protection is detected at an input of the OTC, all protection inputs of the OTC will be scanned every 200 milliseconds five times. If the protection on one of the inputs is still activated after 1 second, then the set will go into protection mode.

Possible protections:

- **8V6 and 5V2 protection.** The presence of the 8V6 and 5V2 is sensed by the OTC. If the 8V6 and/or 5V2 are/is not present, then an error code is stored in the error buffer.

5.7 Repair tips

5.7.1 How to Deal with a "TV configuration" Situation

It is not easy to access the CSM menu without the accompanying plasma monitor. Therefore, it is best to retrieve this information while you still have the complete configuration. Depending on the fault, the problem may be easily solved. However, if this is not the case, some of the data recorded could assist you in the repair.

5.7.2 How to Deal with a "Receiver Box Only" Situation

Without the accompanying plasma monitor, the Receiver box will go into Standby mode after a few seconds (this monitor detection is designed to prevent Philips Receiver boxes from being used with other brands of monitors).

This detection can be overridden in the following way (to use, for example, a PC monitor):

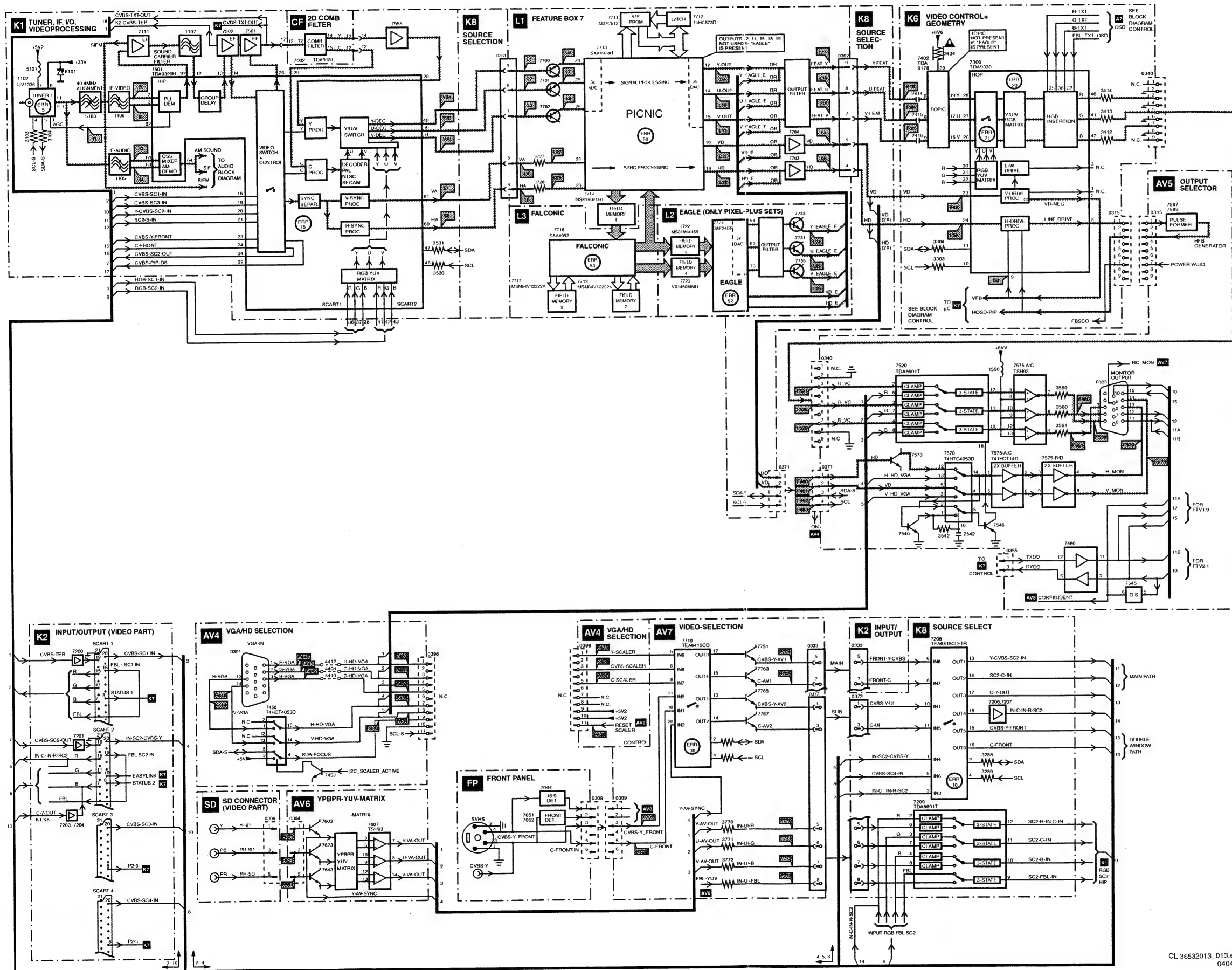
- Enter the SAM-mode via ComPair (using the "align" key of the DST simulation mode), or through the HW intervention of connector 0356 on the SSP (pins 2 and 3). The set will now operate in SDM. Then short pins 1 and 2 to enter SAM.
- Via navigation in the SAM menu and selecting, you must follow the this route: "Service Options" - "Miscellaneous" - "Stand-alone".
- Toggle "No" to "Yes" and store this change (this means that a bit is changed in the NVM).
- Now the Receiver box can operate with any monitor (for example, a PC monitor).
- The Service technician can now perform the diagnosis and repair (the CSM menu can also be accessed now).
- When the problem is solved, the Stand-alone option bit should be reset to "No", to return the set to the original setting.

5.7.3 Miscellaneous Tips/Remarks

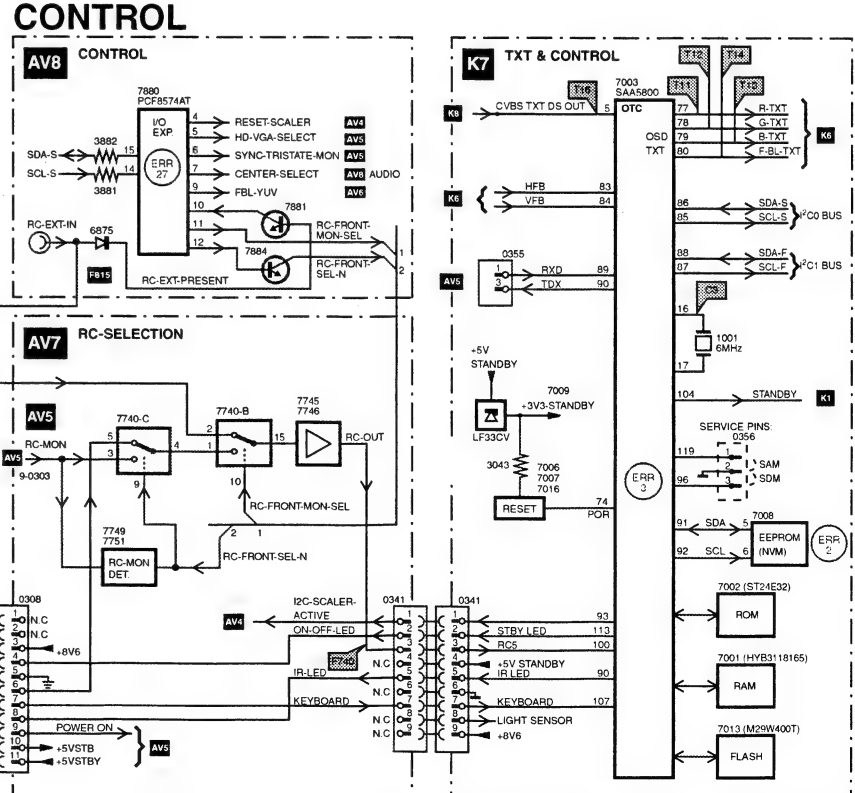
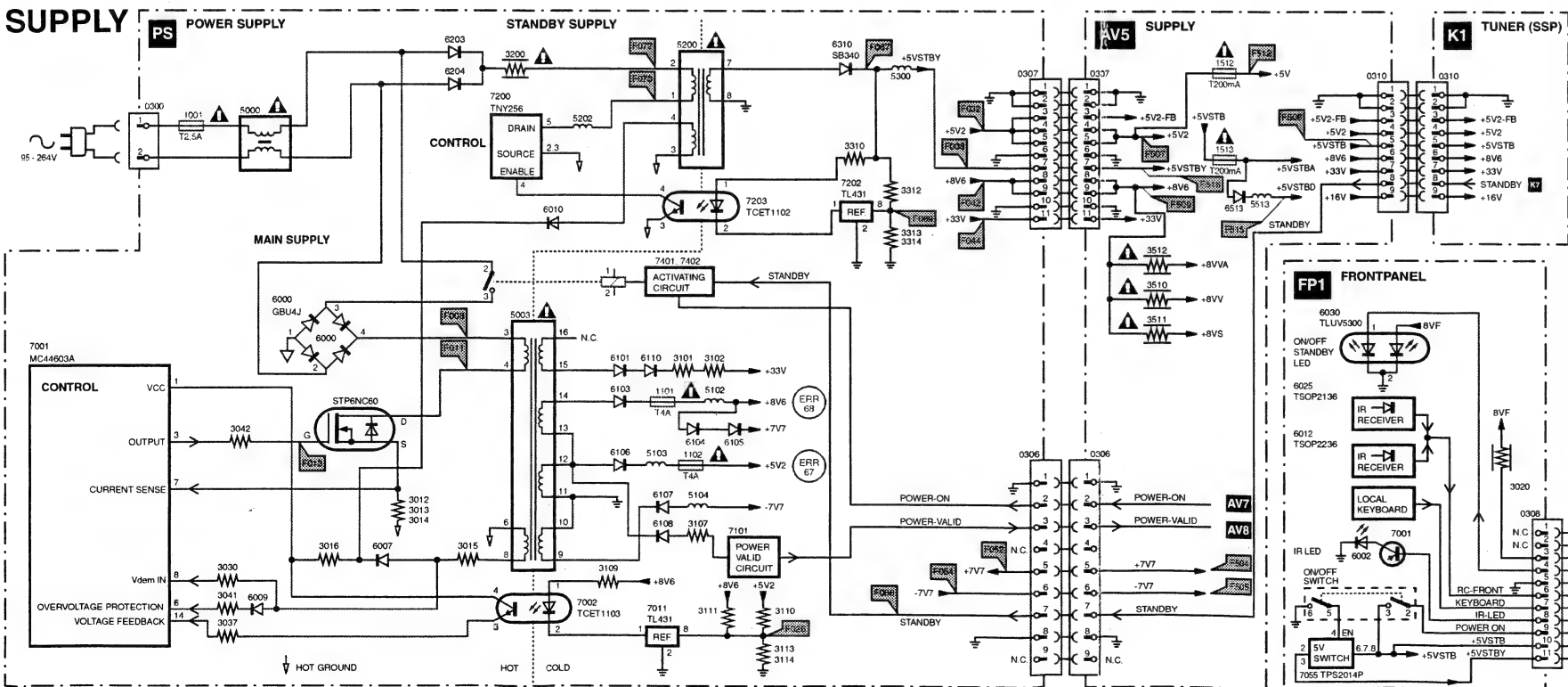
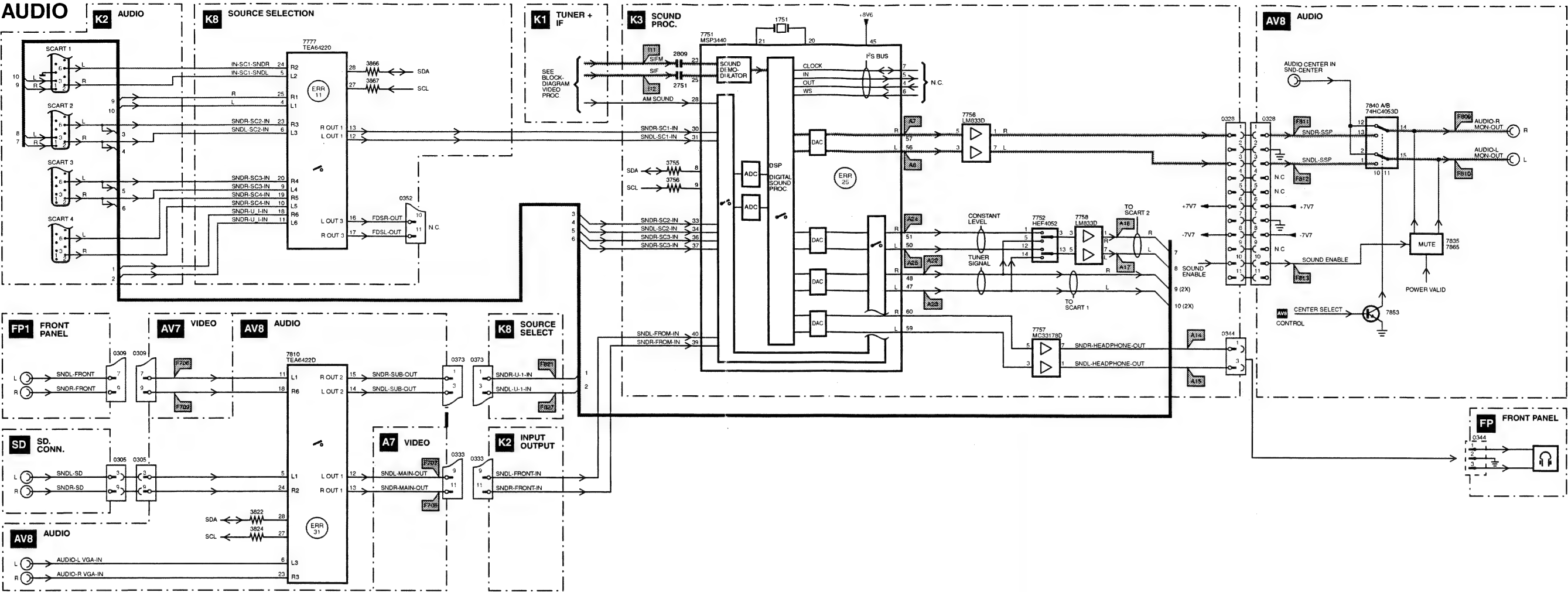
- Sometimes, when there is an NVM related error/problem and the set does not want to start up, it can be helpful to start the set without the NVM (IC7008 on the IC holder on the SSP). You can see OSD on the monitor, for a short time, so you can conclude that much of the circuitry is working fine.
- If an empty EARM (permanent memory) is detected, all settings are set to pre-programmed default (standard) values.
- To overrule the childlock PIN code, use code "0711".
- When the user settings related to optimal picture and sound performance are in doubt, one can restore the default factory settings via: "Settings" - "General" - "Reset AV settings", and pressing the "OK" key on the remote control transmitter. This may help correct an incorrect user setting faster, since the starting point is more clearly defined (for example, the set will leave the factory with "DNR" on medium, "Dynamic Contrast" on medium, and "Sharpness" on 4, etc)..

6. Block Diagrams, Testpoint Overviews and Waveforms

Block Diagram (Video)

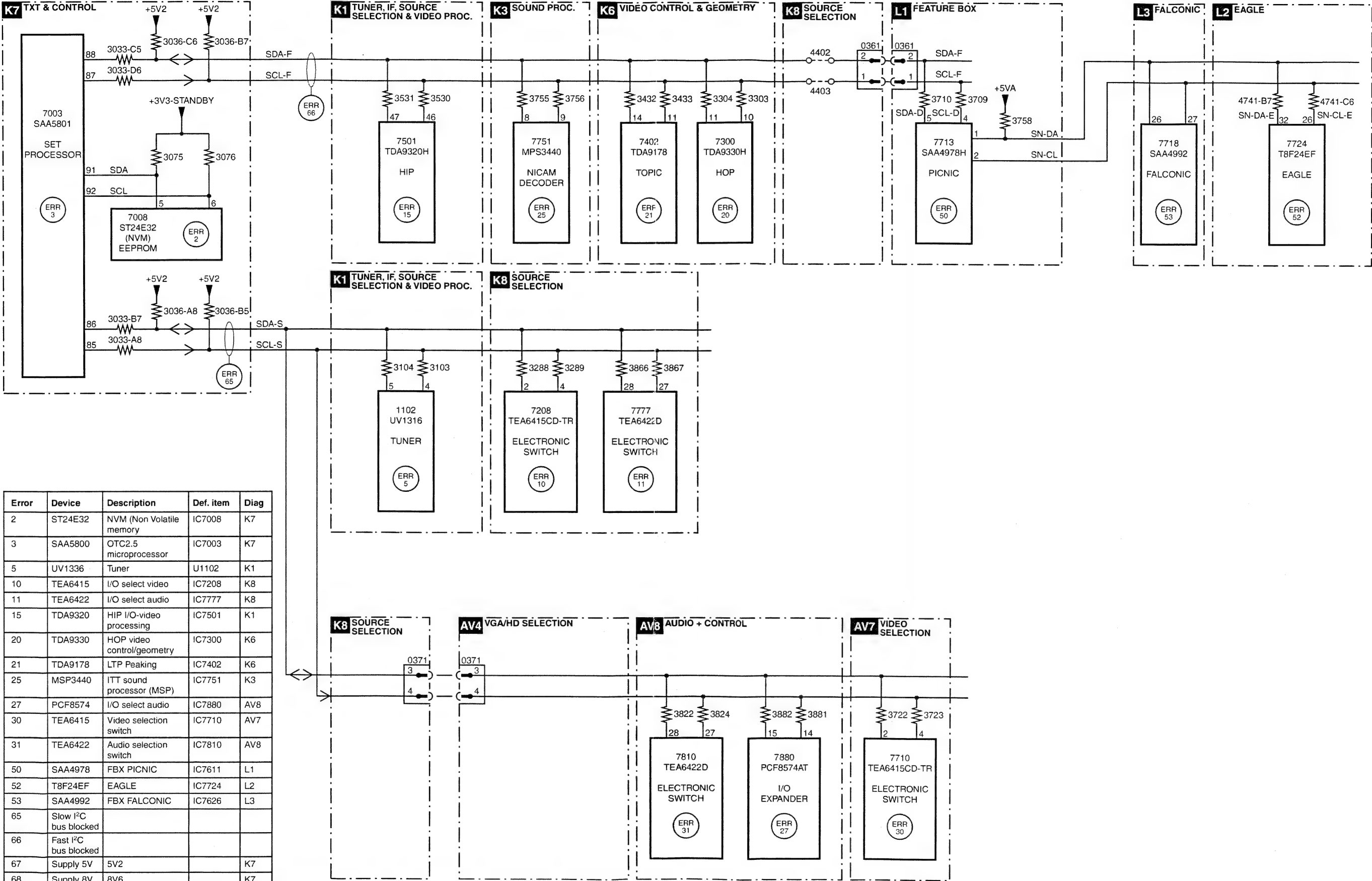


Block Diagram (Audio and Supply)



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110303

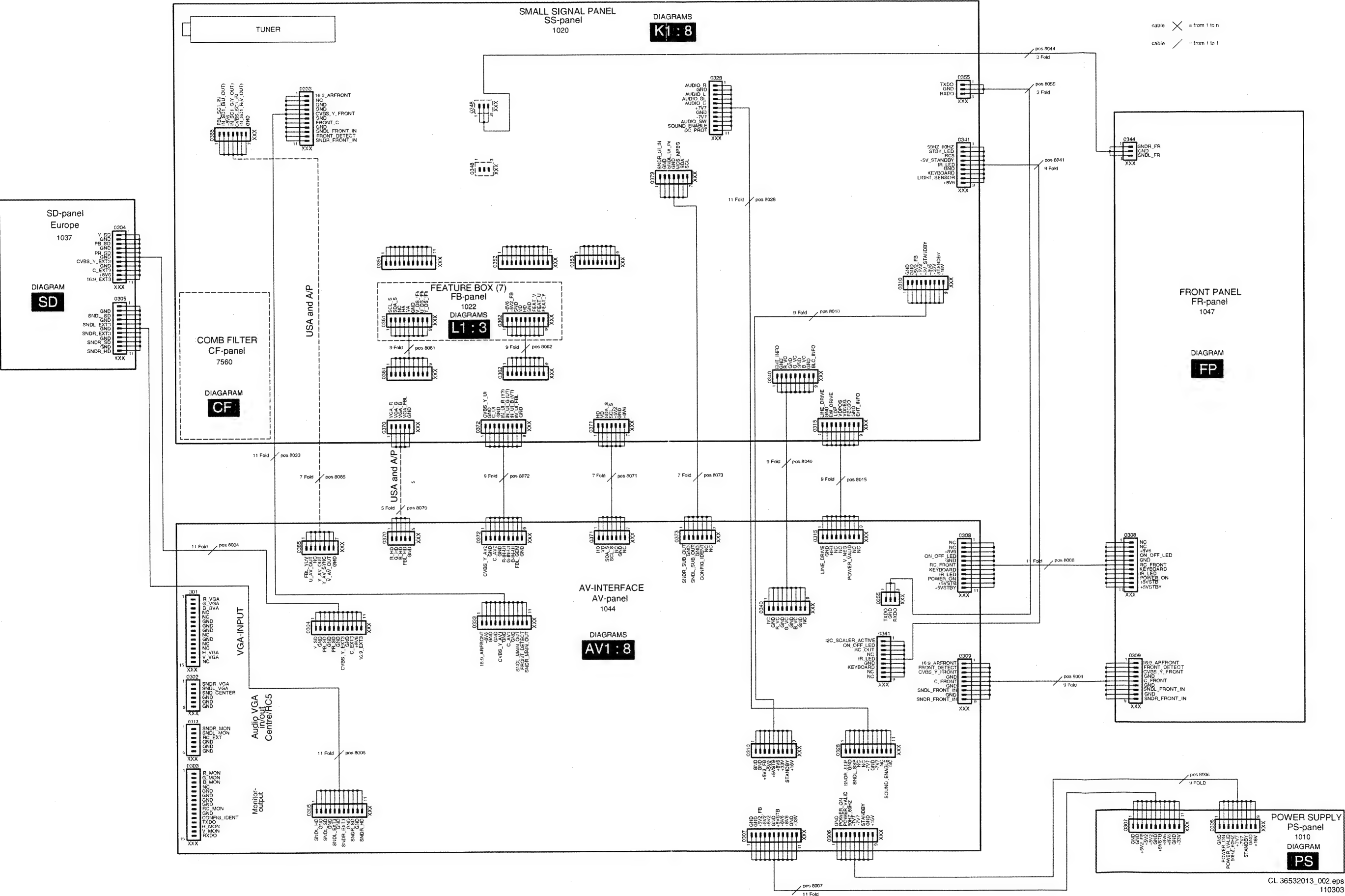
I2C-IC's Overview



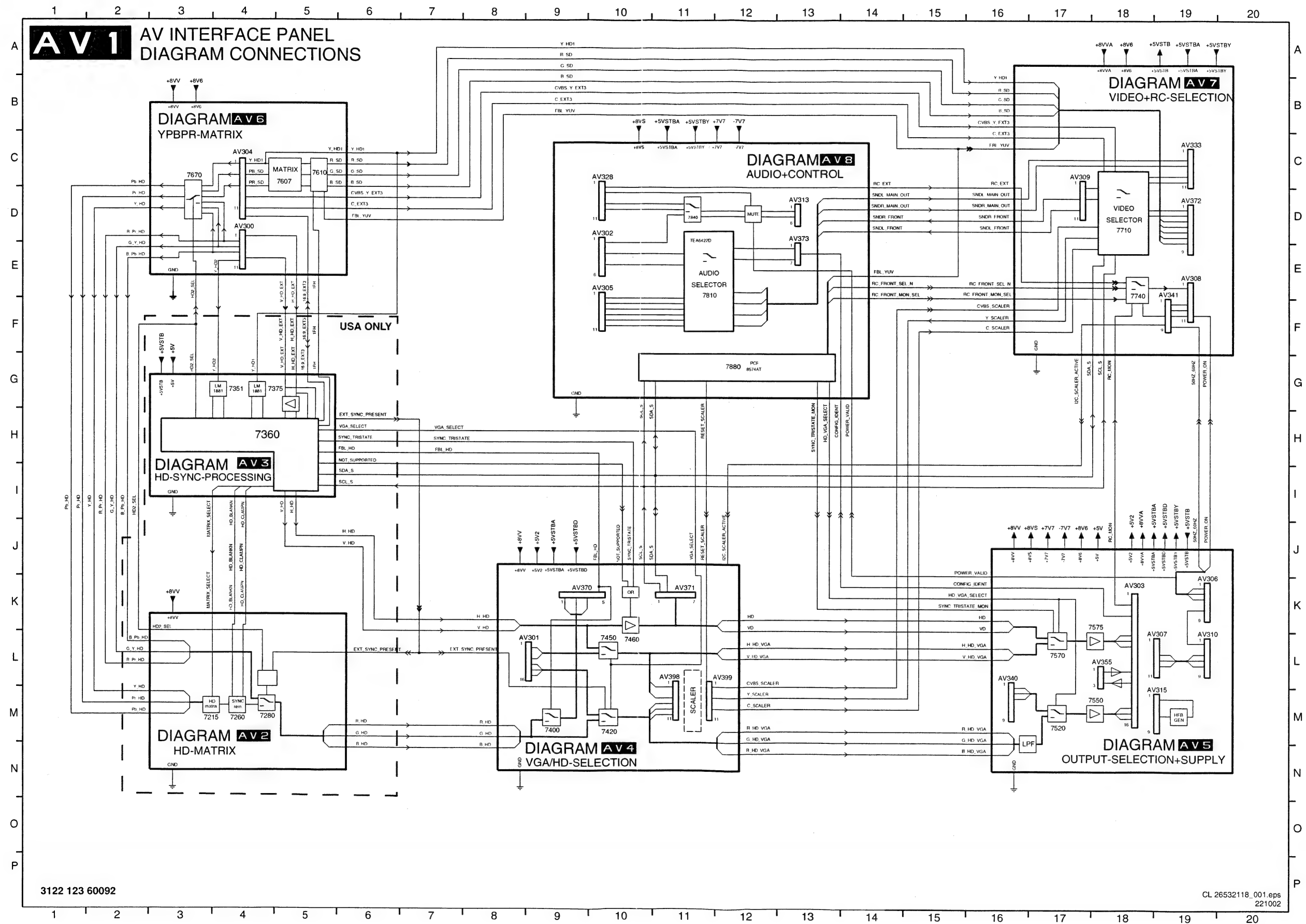
Error	Device	Description	Def. item	Diag
2	ST24E32	NVM (Non Volatile memory)	IC7008	K7
3	SAA5800	OTC2.5 microprocessor	IC7003	K7
5	UV1336	Tuner	U1102	K1
10	TEA6415	I/O select video	IC7208	K8
11	TEA6422	I/O select audio	IC7777	K8
15	TDA9320	HIP I/O-video processing	IC7501	K1
20	TDA9330	HOP video control/geometry	IC7300	K6
21	TDA9178	LTP Peaking	IC7402	K6
25	MSP3440	ITT sound processor (MSP)	IC7751	K3
27	PCF8574	I/O select audio	IC7880	AV8
30	TEA6415	Video selection switch	IC7710	AV7
31	TEA6422	Audio selection switch	IC7810	AV8
50	SAA4978	FBX PICNIC	IC7611	L1
52	T8F24EF	EAGLE	IC7724	L2
53	SAA4992	FBX FALCONIC	IC7626	L3
65	Slow I ² C bus blocked			
66	Fast I ² C bus blocked			
67	Supply 5V	5V2		K7
68	Supply 8V	8V6		K7
77	Feature box protection	FBX-PROT		L1
80	Tuner protection	TUNER-PROT		

NOTE 1) MESSAGE BASED ERRORS ARE RETRIEVABLE VIA COMPAIR TOOL VIA SET, IN THE ERRORBUFFER FOLLOWING ERRORS CAN OCCUR:

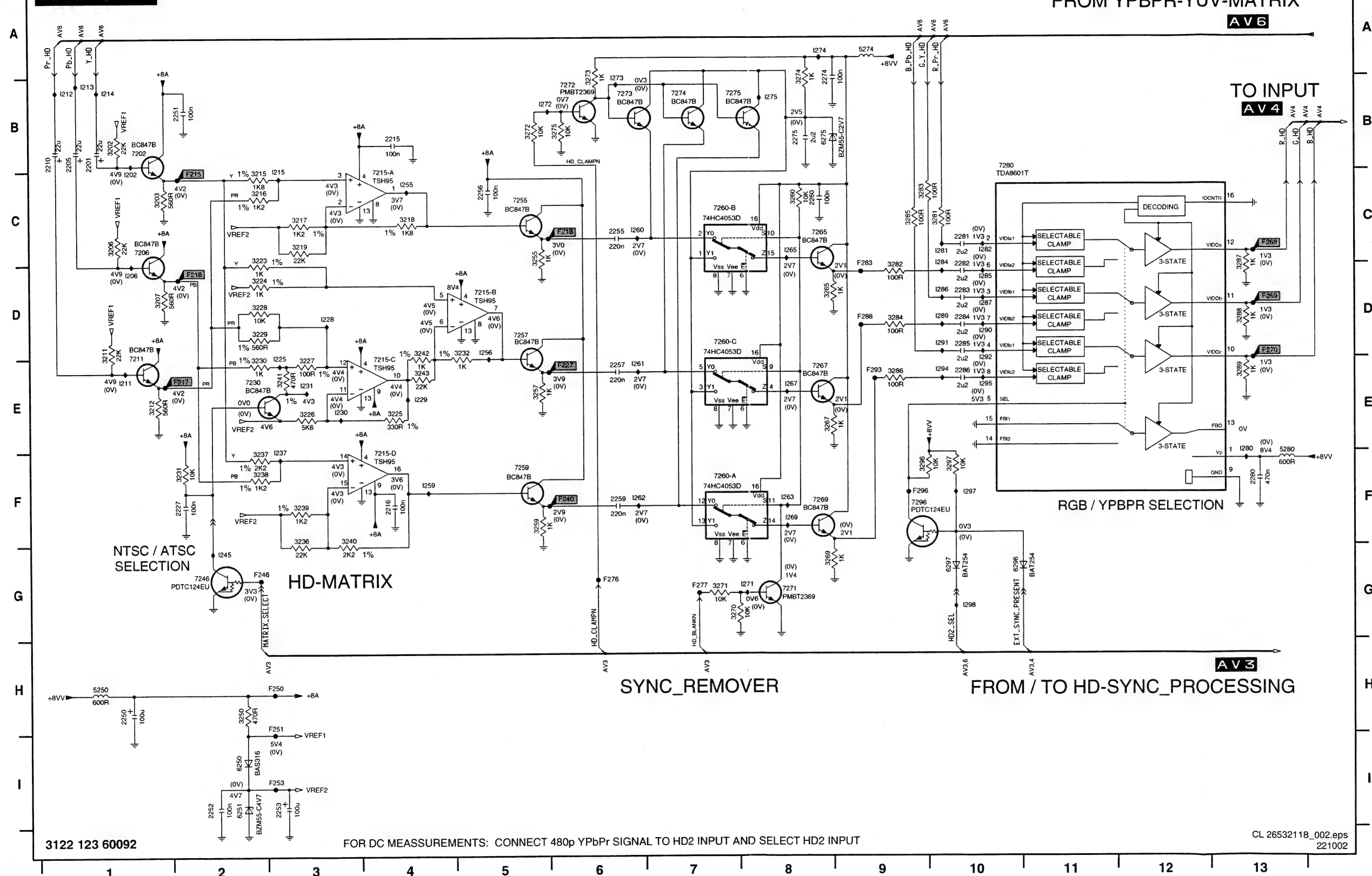
Wiring Diagram



AV Interface Panel

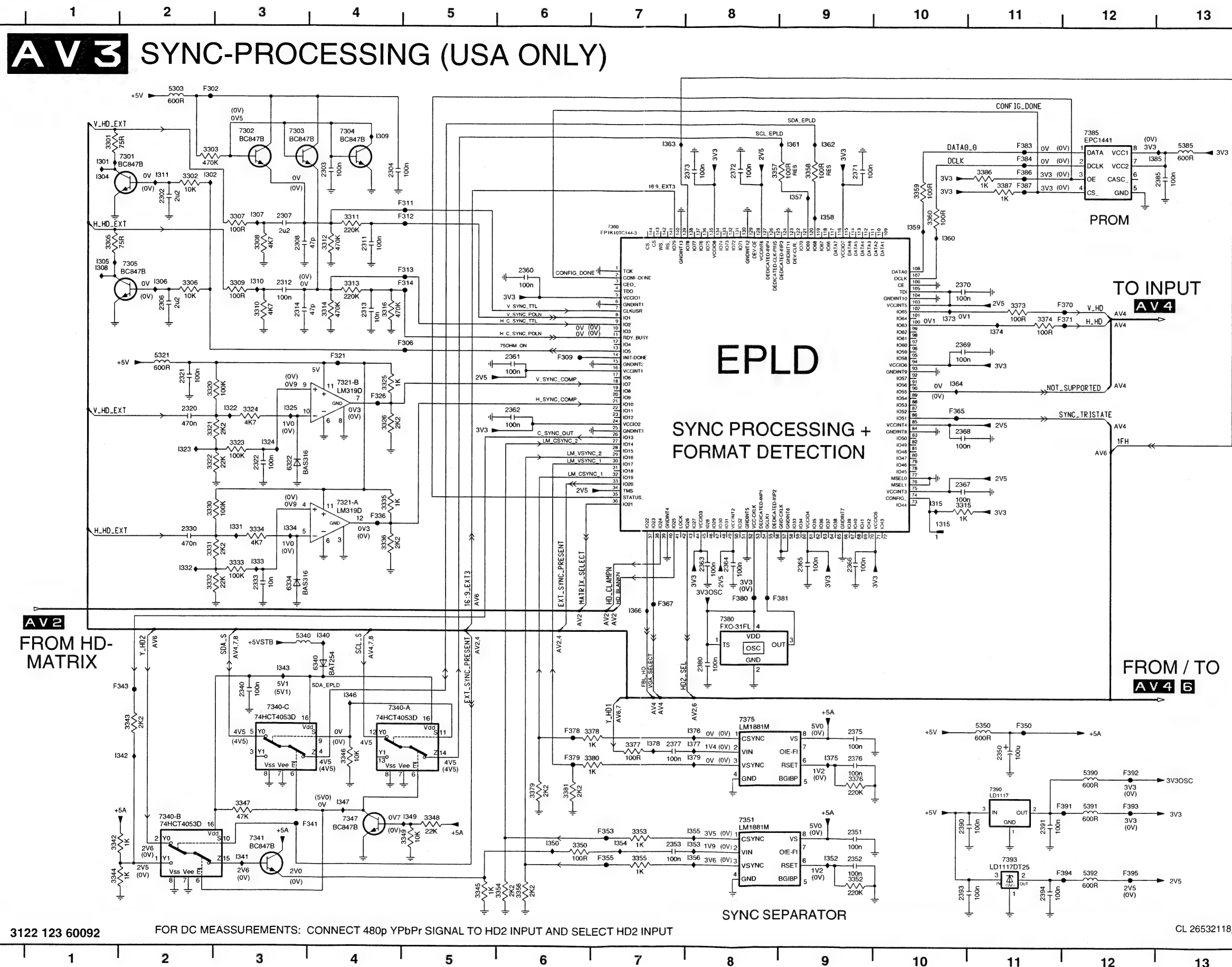


HD Matrix + Sync Remover Panel (USA only)

AV2 HD-MATRIX+SYNC REMOVER (USA ONLY)

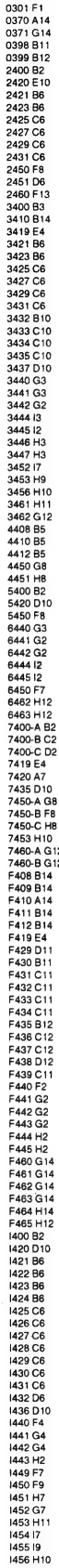
2201 B1	F218 C6
2205 B1	F227 E6
2210 B1	F240 F6
2215 B4	F246 G2
2216 F4	F250 H3
2227 F2	F251 H3
2250 H1	F253 I3
2251 B2	F268 C13
2252 I2	F269 D13
2253 I3	F270 D13
2255 C6	F276 G6
2256 C5	F277 G7
2257 E6	F283 C9
2259 F6	F288 D9
2260 C8	F293 E9
2274 B8	F296 F9
2275 B8	I202 C1
2280 F13	I206 D1
2281 C10	I211 E1
2282 D10	I212 B1
2283 D10	I213 B1
2284 D10	I214 B1
2285 D10	I215 B3
2286 E10	I225 D3
3202 B1	I228 D3
3203 C1	I229 E4
3206 C1	I230 E3
3207 D1	I231 E3
3211 D1	I237 E3
3212 E1	I245 G2
3215 C2	I255 C4
3216 C2	I256 D5
3217 C3	I259 F4
3218 C4	I260 C6
3219 C3	I261 E6
3223 C2	I262 F6
3224 D2	I263 F8
3225 E4	I265 C8
3226 E3	I267 E8
3227 E3	I269 F8
3228 D2	I271 G8
3229 D2	I272 B5
3230 E2	I273 B6
3231 F2	I274 A8
3232 D5	I275 B8
3236 F3	I280 E13
3237 F2	I281 C10
3238 F2	I282 C10
3239 F3	I284 C10
3240 F3	I285 D10
3241 E3	I286 D10
3242 D4	I287 D10
3243 E4	I289 D10
3250 H2	I290 D10
3255 C5	I291 D10
3257 E5	I292 E10
3259 F5	I294 E10
3260 C8	I295 E10
3265 D8	I297 F10
3267 E8	I298 G10
3269 G8	
3270 G7	
3271 G7	
3272 B5	
3273 B6	
3274 B8	
3275 B6	
3282 D9	
3283 C9	
3284 D9	
3285 C9	
3286 E9	
3287 D13	
3288 D13	
3289 E13	
3296 F9	
3297 F10	
5250 H1	
5274 A9	
5280 F13	
6250 I2	
6251 I2	
6275 B8	
6296 G10	
6297 G10	
7202 B1	
7206 C1	
7211 E1	
7215-A C4	
7215-B D5	
7215-C E4	
7215-D F4	
7230 E2	
7246 G2	
7255 C5	
7257 D5	
7259 F5	
7260-A F7	
7260-B C7	
7260-C D7	
7265 C8	
7267 E8	
7269 F8	
7271 G8	
7272 B6	
7273 B6	
7274 B7	
7275 B7	
7280 B10	
7296 F9	
F215 C2	
F216 D2	
F217 E2	

Sync Processing Panel (USA only)

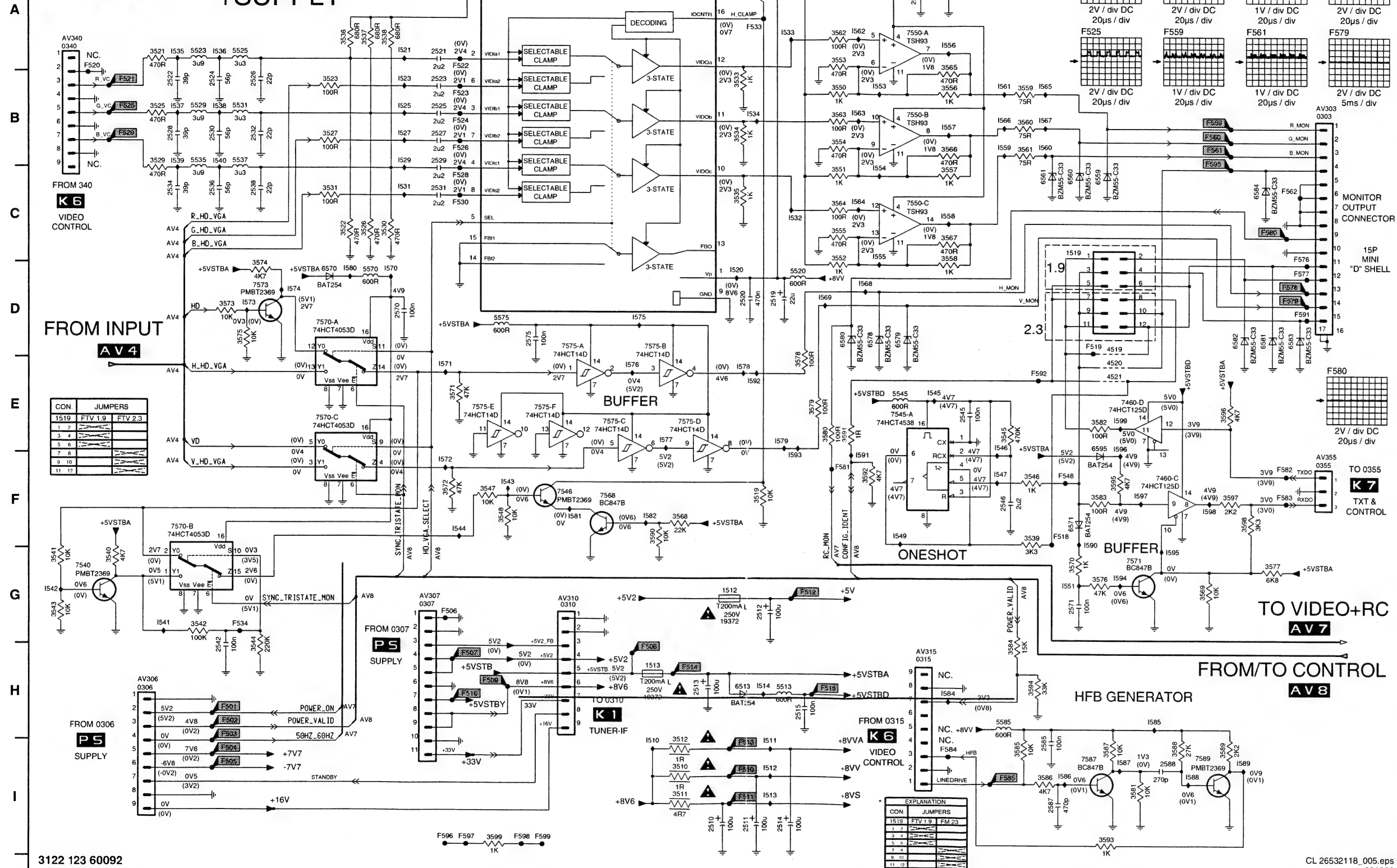


1315 E10	7321-A E4
2302 B2	7321-B D4
2303 B4	7340-A G4
2304 B4	7340-B I2
2306 C2	7340-C G3
2307 B3	7341 I3
2308 B3	7347 I4
2311 B4	7351 I8
2312 C3	7360 B7
2313 C4	7375 H8
2314 C3	7380 F8
2320 D2	7385 A12
2321 D2	7390 H11
2322 E3	7393 I11
2330 E2	F302 A2
2333 F3	F306 C5
2340 G3	F309 D6
2350 H11	F311 B5
2351 I9	F312 B5
2352 I9	F313 C5
2353 I8	F314 C5
2360 C6	F321 D4
2361 D6	F326 D4
2362 D6	F336 E4
2363 F8	F341 I4
2364 F8	F342 G2
2365 F9	F350 H11
2366 F9	F353 I7
2367 E10	F355 I7
2368 D11	F365 D10
2369 C10	F367 F7
2370 C11	F370 C12
2371 B9	F371 C12
2372 B8	F378 H6
2373 B8	F379 H6
2375 H9	F380 F8
2376 H9	F381 F9
2377 H8	F383 A11
2380 G8	F384 A11
2385 B12	F386 B11
2390 H10	F387 B11
2391 I11	F391 H12
2393 H10	F392 H12
2394 H11	F393 H12
3301 A1	F394 I12
3302 B2	F395 I12
3303 A2	I301 B1
3305 B1	I302 B2
3306 C1	I304 B1
3307 B3	I305 C1
3308 B3	I306 C2
3309 C3	I307 B3
3310 C3	I308 C1
3311 B4	I309 A4
3312 B4	I310 C3
3313 C4	I311 B2
3314 C4	I315 E10
3315 E10	I322 D3
3316 C4	I323 E2
3320 D2	I324 E2
3321 D2	I325 D3
3322 E2	I331 E3
3323 E3	I332 F2
3324 D3	I333 F3
3325 D4	I334 E3
3326 D4	I340 G4
3330 E2	I341 I3
3331 F2	I342 H2
3332 F2	I343 G3
3333 F3	I346 G4
3334 E3	I347 H4
3335 E4	I349 I5
3336 F4	I350 I6
3342 I1	I352 I9
3343 H2	I353 I8
3344 I1	I354 I7
3345 I5	I355 I8
3346 H4	I356 I8
3347 H3	I357 B9
3348 I5	I358 B9
3349 I5	I359 B10
3350 I7	I360 C10
3352 I9	I361 A9
3353 I7	I362 A9
3354 I6	I363 A7
3355 I7	I364 D10
3356 I6	I366 F7
3357 B8	I373 C10
3358 B9	I374 C11
3359 B10	I375 H9
3360 B10	I376 H8
3373 C11	I377 H8
3374 C11	I378 H7
3376 H9	I379 H8
3377 H7	I385 A12
3378 H7	
3379 H6	
3380 H7	
3381 H6	
3386 B11	
3387 B11	
5303 A2	
5321 D2	
5340 G3	
5350 H11	
5385 A13	
5390 H12	
5391 H12	
5392 I12	
6322 E3	
6334 F3	
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7302 A3	
7303 A3	
7304 A4	
7305 C2	

AV 4 VGA/HD-SELECTION

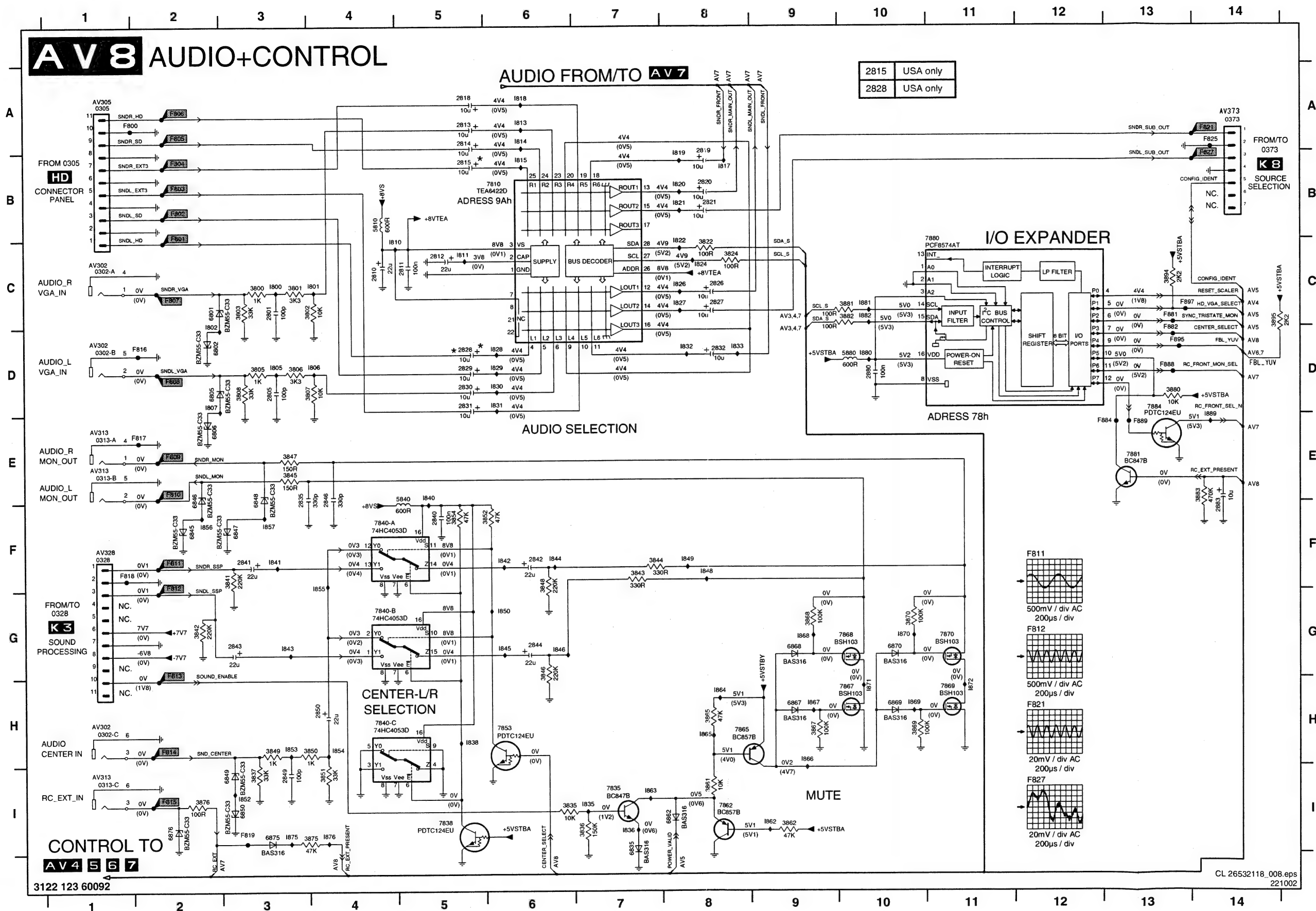


Output Selection + Supply Panel

AV5 OUTPUT-SELECTION
+SUPPLY

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221002

Audio + Control Panel



Mapping Layout AV

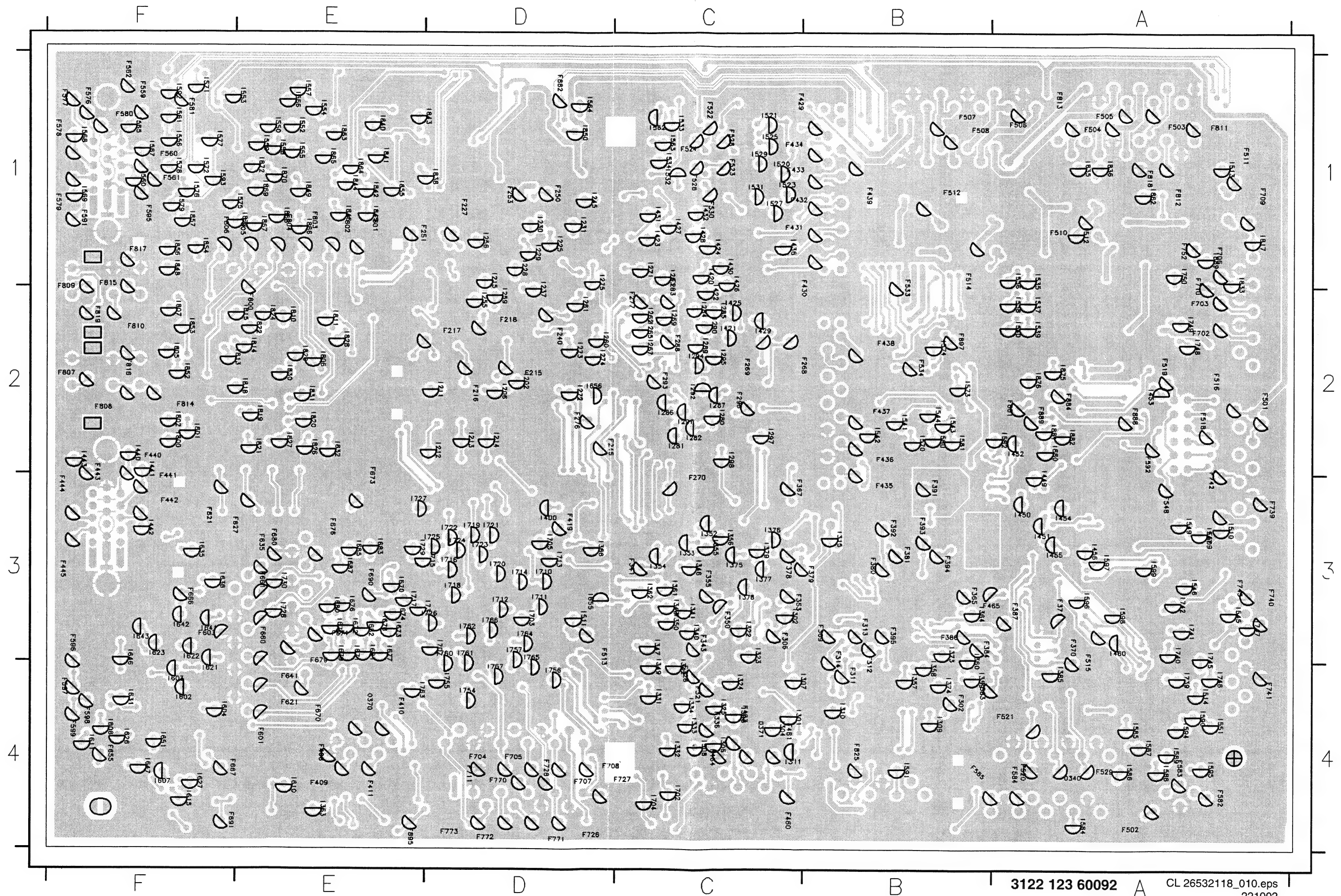
Mapping Top Side

0300 E2	2391 B2	2813 F3	3313 C1	3543 B3	3675 E2	3854 D4	6667 F1	7710 D2
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0302 F3	2394 B2	2815 F3	3315 B1	3545 A2	3679 E2	3862 A4	6679 E1	7745 A2
0303 F4	2400 D2	2818 F3	3320 C1	3546 A2	3681 E2	3865 E4	6740 A1	7746 A2
0304 E2	2420 C4	2819 F3	3321 C1	3547 B3	3683 E2	3867 E4	6741 A2	7749 A3
0305 E4	2421 C3	2820 E3	3322 C1	3548 B3	3684 E2	3868 E4	6748 A3	7751 A4
0306 A4	2423 C4	2821 F3	3323 C1	3550 F4	3685 E2	3869 E4	6801 F3	7761 D1
0307 B4	2425 C3	2826 E3	3324 C1	3551 E4	3686 E2	3870 E4	6802 F3	7763 E1
0308 A2	2427 C4	2827 E3	3325 C1	3552 E4	3687 E2	3875 A3	6805 F3	7765 D1
0309 A3	2429 C3	2828 E3	3326 C1	3553 F4	3688 E2	3876 F3	6806 F3	7767 D1
0310 B4	2431 C4	2829 E3	3330 C1	3554 E4	3690 E2	3880 A3	6835 A4	7810 E3
0313 F3	2450 A2	2830 E3	3331 C1	3555 E4	3691 E1	3881 A3	6845 F4	7835 A4
0315 A1	2451 A2	2831 E3	3332 C1	3556 F4	3705 E2	3882 A3	6846 F4	7838 D4
0328 A4	2460 A2	2832 E3	3333 C1	3557 E4	3706 D2	3883 A3	6847 F4	7840 E4
0333 D1	2510 A4	2835 F4	3334 C1	3558 E4	3707 E2	3894 A3	6848 F4	7853 D4
0340 A1	2511 A4	2840 E4	3335 C1	3559 F4	3708 E2	3895 A3	6849 F3	7862 A4
0341 A2	2512 B4	2841 E4	3336 C1	3560 F4	3709 E2	4408 C4	6850 F3	7865 E4
0355 A1	2513 A4	2842 E4	3342 C2	3561 F4	3710 D2	4410 C4	6862 A4	7867 E4
0370 E1	2514 D2	2843 D4	3343 C2	3562 C4	3711 D2	4412 C4	6867 E4	7868 E4
0371 C1	2515 A1	2844 E4	3344 C2	3563 C4	3712 D2	4450 A2	6868 E4	7869 E4
0372 D1	2520 C4	2846 F4	3345 C2	3564 C4	3713 D2	4451 A2	6869 E4	7870 E4
0373 B1	2521 C4	2849 F3	3346 C2	3565 F4	3714 D2	4519 A3	6870 E4	7880 A3
0398 B4	2522 A4	2850 F4	3347 C2	3566 E4	3715 E2	4520 A3	6875 A3	7881 A3
0399 B3	2523 C4	2880 A3	3352 C2	3567 E4	3716 D2	4521 A2	6876 F3	7884 A3
1315 C1	2524 A4	2883 A3	3353 C2	3569 A1	3717 E2	4741 A3	7202 D3	
1340 C2	2525 C4	3201 D3	3354 C2	3570 A1	3718 D2	4742 A3	7206 D3	
1341 C2	2526 B4	3202 D3	3355 C2	3571 F4	3719 D2	5250 D4	7211 D3	
1342 C2	2527 C4	3203 D3	3356 C2	3572 F4	3720 D2	5274 C3	7215 D4	
1512 B4	2528 A3	3205 D3	3357 B1	3573 B3	3721 D2	5280 C3	7230 D4	
1513 A4	2529 C4	3206 D3	3358 B1	3574 B3	3722 D2	5303 B1	7246 D4	
1519 A3	2530 A3	3207 D3	3359 B1	3575 B3	3723 D2	5321 C1	7255 D3	
2201 D3	2531 C4	3210 E3	3360 B1	3576 A1	3724 D2	5340 C2	7257 D4	
2205 D3	2532 B3	3211 D3	3376 C2	3577 A1	3725 D2	5350 C2	7259 D3	
2210 D3	2534 A3	3212 E3	3377 C2	3578 F4	3726 D1	5385 B1	7260 C3	
2215 D4	2536 A3	3215 D3	3378 C2	3579 F4	3727 D2	5400 D2	7265 C3	
2227 D4	2538 B3	3216 D4	3379 C2	3580 F4	3728 E1	5420 C4	7267 C3	
2250 D4	2542 B3	3217 D3	3380 C2	3581 A1	3729 D1	5450 A2	7269 C3	
2251 D4	2545 A2	3218 D3	3381 C2	3582 A3	3730 D2	5513 A1	7271 C4	
2252 D4	2546 A2	3223 D4	3386 B2	3583 A2	3732 D2	5520 C4	7272 D3	
2253 D4	2550 F4	3224 D4	3387 B2	3584 A1	3733 D2	5523 A4	7273 D3	
2255 D3	2551 F4	3225 D4	3400 D2	3585 A1	3743 A2	5525 A4	7274 D3	
2257 D4	2570 B3	3226 D4	3410 D1	3586 A1	3744 A2	5529 A3	7275 D4	
2259 D4	2571 A1	3227 D4	3419 D2	3587 A1	3745 A1	5531 A3	7280 C3	
2260 C3	2575 F4	3228 D4	3421 C3	3588 A1	3746 A2	5535 A3	7296 C3	
2274 C3	2585 A1	3229 D4	3423 C4	3589 A1	3747 A1	5537 A3	7301 C1	
2275 D3	2587 A1	3230 D4	3425 C3	3591 B1	3748 A3	5545 A2	7302 B1	
2280 C3	2588 A1	3231 D4	3427 C4	3592 B1	3749 A3	5550 F4	7303 B1	
2281 C3	2601 F1	3232 D4	3429 C3	3593 A1	3750 A4	5570 B3	7304 B1	
2282 C3	2607 F1	3237 D3	3431 C4	3594 A1	3752 A4	5575 E4	7305 C1	
2283 C3	2608 F1	3238 D4	3432 B4	3595 A2	3754 D1	5585 A1	7321 C1	
2284 C3	2610 E1	3239 D3	3433 B4	3596 A2	3755 D1	5610 E1	7340 C2	
2285 C3	2622 F2	3240 D3	3434 B4	3597 A1	3756 D1	5655 E1	7341 C2	
2286 C3	2628 F1	3241 D4	3435 B4	3598 A1	3757 D1	5670 E2	7347 C2	
2303 B1	2642 F2	3242 D4	3437 B4	3599 F1	3760 D1	5710 D2	7351 C2	
2304 B1	2648 F1	3250 D4	3440 F2	3602 F1	3761 D2	5740 A1	7360 B2	
2307 C1	2655 E1	3255 D3	3441 F2	3603 F1	3762 E1	5810 E3	7375 C2	
2311 C2	2656 F1	3257 D4	3442 F2	3605 F1	3763 D1	5840 E4	7380 B2	
2312 B1	2657 D3	3259 D3	3444 F2	3606 F1	3764 D2	5880 A3	7385 A2	
2313 C1	2665 E1	3260 C4	3445 F2	3608 F1	3765 D2	6250 D4	7390 B2	
2320 C1	2666 F1	3265 C4	3446 F2	3609 F1	3766 D2	6251 D4	7393 B2	
2321 C1	2670 E2	3267 C3	3447 F2	3610 F1	3767 D2	6275 D4	7400 D2	
2322 C1	2671 E2	3269 C3	3452 A2	3611 E1	3768 D1	6296 C3	7419 D2	
2330 C1	2673 E2	3270 C4	3453 A2	3615 F1	3769 D1	6297 C3	7420 C4	
2333 C1	2675 E2	3271 C4	3461 B2	3622 F1	3773 D1	6322 C1	7435 C4	
2340 C2	2677 E2	3272 D3	3462 A2	3623 F2	3800 F3	6334 C1	7450 A2	
2350 C2	2679 E2	3273 D3	3510 A4	3625 F2	3801 F3	6340 C2	7453 A2	
2351 C2	2681 E2	3274 D3	3511 A4	3626 F1	3802 F3	6440 F3	7460 A2	
2352 C2	2707 D2	3275 D3	3512 D2	3627 F2	3803 F3	6441 F2	7520 C4	
2353 C2	2708 D2	3281 C3	3519 C4	3628 F1	3805 F3	6442 F2	7540 B3	
2360 B1	2710 D2	3282 C3	3520 C4	3629 F1	3806 F3	6444 F2	7545 A2	
2361 B2	2711 D2	3283 C3	3521 A4	3630 F1	3807 F3	6445 F2	7546 B3	
2362 B2	2713 D2	3284 C3	3522 C4	3631 F2	3808 F3	6450 A2	7550 E4	
2363 B2	2715 D2	3285 C3	3523 C4	3635 F2	3822 E3	6462 B2	7568 B3	
2364 B2	2717 D2	3286 C3	3525 A3	3636 F2	3824 E3	6463 B2	7570 B3	
2365 B2	2720 D2	3287 C3	3526 C4	3637 F2	3835 A4	6513 A1	7571 A1	
2366 B2	2721 D2	3288 C3	3527 C4	3638 F2	3836 A4	6559 F4	7573 B3	
2367 B2	2724 D2	3289 C3	3529 A3	3642 F2	3837 F3	6560 F4	7575 F4	
2368 B2	2725 D2	3296 C3	3530 C4	3643 F2	3841 E4	6561 F4	7587 A1	
2369 B2	2726 D2	3297 C3	3531 C4	3645 F2	3842 E4	6570 B3	7589 A1	
2370 B2	2727 D2	3301 C1	3533 C4	3648 F1	3843 E4	6571 A1	7603 F1	
2371 B1	2729 D1	3303 B1	3534 C4	3649 F2	3844 E4	6578 F4	7607 F1	
2372 B1	2740 A2	3304 B1	3535 C4	3650 F1	3845 F4	6579 F4	7610 F1	
2373 B1	2748 A3	3305 C1	3536 C4	3651 F1	3846 E4	6580 F4	7615 F1	
2375 C2	2765 E1	3307 C1	3537 C4	3655 C3	3847 F4	6581 F4	7623 F2	
2376 C2	2801 F3	3308 C1	3538 C4	3656 D3	3848 E4	6582 F4	7635 F2	
2377 C2	2805 F3	3309 B1	3539 A2	3657 D3	3849 F3	6583 F4	7643 F2	
2380 B2	2810 E3	3310 B1	3540 B3	3666 F1	3850 F4	6584 F4	7670 E2	
2385 B1	2811 E3	3311 B2	3541 B3	3671 E2	3851 F4	6595 A2	7690 E2	
2390 B2	2812 E3	3312 C1	3542 B3	3673 E2	3852 E4	6666 F1	7691 E1	

Mapping Bottom Side

F204 D3	F523 C1	F883 E3	I355 B3	I559 E1	I749 A2
F205 D3	F524 C1	F884 A1	I356 B3	I560 F1	I750 A1
F206 D3	F525 A4	F885 B3	I357 B4	I561 F1	I751 A1
F208 D3	F526 C1	F886 A3	I358 B4	I562 C1	I754 E4
F209 D3	F528 C1	F887 A3	I359 B4	I563 C1	I755 E4
F210 D2	F529 A4	F888 A2	I360 B3	I564 D1	I756 D4
F215 D2	F530 C1	F889 A2	I383 A4	I565 F1	I757 D4
F216 D2	F533 B1	F890 D3	I384 A3	I566 E1	I760 E4
F217 E2	F534 B2	F891 D4	I385 A4	I567 F1	I761 E4
F218 D1	F559 F1	F892 A3	I386 B3	I568 F1	I762 E3
F222 D1	F560 F1	F893 D3	I387 B3	I569 F1	I763 E4
F227 D2	F561 F1	F894 C3	I400 C2	I570 B2	I764 D3
F232 D1	F562 F1	F895 E4	I401 C2	I571 F1	I765 D4
F236 D2	F578 F1	F896 D3	I402 C2	I572 F1	I766 E3
F240 D1	F579 F1	F897 B2	I403 C2	I573 B2	I767 E4
F250 D1	F580 F1	F898 A3	I404 C2	I574 B2	I800 F2
F251 D2	F581 F1	F899 A3	I405 C2	I575 F1	I801 F2
F253 D1	F584 A4	I201 D2	I406 C2	I576 F1	I802 F2
F255 C2	F585 B4	I202 D2	I407 C2	I577 F1	I805 F2
F268 C2	F590 A4	I205 D2	I408 C2	I578 F1	I806 E2
F269 C1	F596 F3	I206 D2	I409 C2	I579 F1	I807 F2
F270 C1	F597 F4	I210 D2	I410 C2	I580 F1	I810 E2
F302 B4	F598 F4	I211 D2	I411 C2	I581 F1	I811 E2
F306 C3	F599 F4	I215 D2	I412 C2	I582 A4	I813 E2
F309 B3	F601 E4	I219 D1	I415 D2	I583 A4	I814 E2
F311 B4	F602 F4	I225 D2	I416 C2	I584 A4	I815 E2
F312 B3	F603 F3	I230 D1	I417 C3	I585 A4	I817 A1
F313 B3	F621 E4	I233 D2	I418 C2	I586 A4	I818 E2
F314 B3	F622 F4	I237 D1	I419 C2	I587 A4	I819 E2
F321 C4	F641 E4	I260 D2	I420 C2	I588 A4	I820 E2
F326 C3	F642 F4	I261 D1	I421 C2	I589 A4	I821 E2
F336 C4	F643 F4	I262 D2	I422 C2	I590 F1	I822 E2
F341 C3	F655 F4	I263 D2	I423 C1	I591 B4	I824 E2
F343 C3	F660 E3	I264 D2	I424 C1	I592 F1	I826 E2
F350 C3	F661 E3	I265 D1	I425 C1	I593 F1	I827 E2
F353 B3	F662 E4	I266 D2	I426 C1	I595 F1	I828 E2
F355 B3	F663 F4	I267 D2	I427 C1	I596 A2	I829 E2
F370 B4	F666 F3	I268 D2	I428 C1	I597 A3	I830 E2
F371 B3	F667 F4	I269 D1	I429 C1	I598 A3	I831 E2
F380 B3	F702 A2	I270 D2	I430 C1	I599 A3	I832 E2
F381 B3	F703 A2	I271 D2	I431 C1	I602 F4	I833 A1
F391 B3	F704 D4	I272 D2	I432 C1	I603 F4	I835 A1
F394 B3	F705 D4	I273 D2	I435 B1	I604 F4	I836 A1
F408 E4	F706 A1	I274 D2	I436 C1	I607 F4	I840 E1
F409 E4	F707 D4	I275 C2	I440 F2	I608 F4	I841 E1
F410 E4	F708 D4	I276 B2	I441 F2	I621 F4	I842 E1
F411 E4	F709 A1	I277 C2	I442 F3	I622 F3	I843 E1
F412 E4	F710 A1	I279 C2	I443 F2	I623 F3	I844 E1
F429 B1	F711 D4	I280 C2	I450 A2	I626 F4	I845 E1
F430 C2	F726 D4	I281 C2	I451 A2	I627 F4	I846 E1
F431 C1	F727 C4	I282 C2	I452 A2	I641 F3	I848 F1
F432 C1	F728 D4	I283 C2	I453 A2	I642 F3	I849 E1
F433 C1	F739 A3	I285 C2	I454 A2	I643 F3	I

Layout AV Panel (Bottom Side)



2D Comb Filter Add-on

I01 B5 I02 B4 I03 B7 I04 D7 I05 C5 I06 D2 I07 C4 I08 C3 0002 C8 0003 A8 1001 A7 2000 D3 2001 D5 2002 B3 2003 B3 3000 D5 3001 C4 3002 C5 3003 D3 3004 B5 3999 E1 4000 B4 4001 D2 4002 B4 4003 D3 5000 B8 5001 D8 7000 B5 7001 C4 7002 B2 F001 C8 F002 D3 F003 B8 F004 D8 F005 D8 F006 B8 F007 B8 F008 E8 F009 D8 F010 C8 F011 C8 F012 E1 F013 E1

1 2 3 4 5 6 7 8 9

CF

2D COMB FILTER ADD-ON

(Flying wire to clamp pulse SSP, FTV1.9 only,
GFL SSP Feature lift video processing in 10-7352)

To Diagram K1-SSP
Original pinning of IC socket 7560

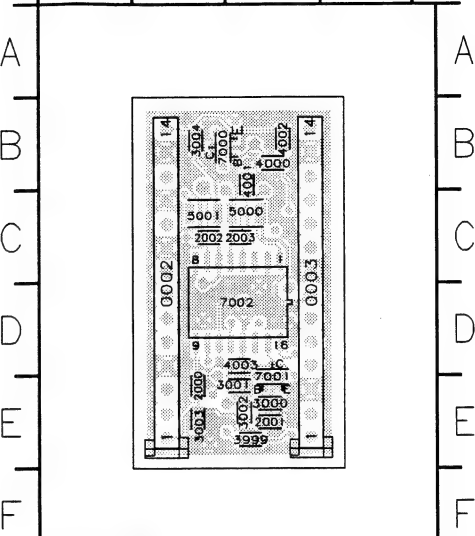
0003
DSM2002-14-PB

1	0V0	28
2	5V1	27
3		26
4	4V2	25
5	0V2	24
6	5V0	23
7	5V1	22
8		21
9	0V0	20
10	0V0	19
11	0V0	18
12	1V6	17
13		16
14	0V3	15

0002
DSM2002-14-PB

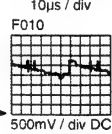
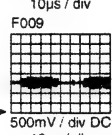
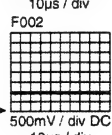
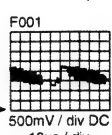
14	2V2	14
13		13
12	1V5	12
11		11
10	0V9	10
9		9
8	5V1	8
7	5V1	7
6	5V1	6
5	0V0	5
4		4
3	4V2	3
2	0V0	2
1	4V2	1

1 2 3 4

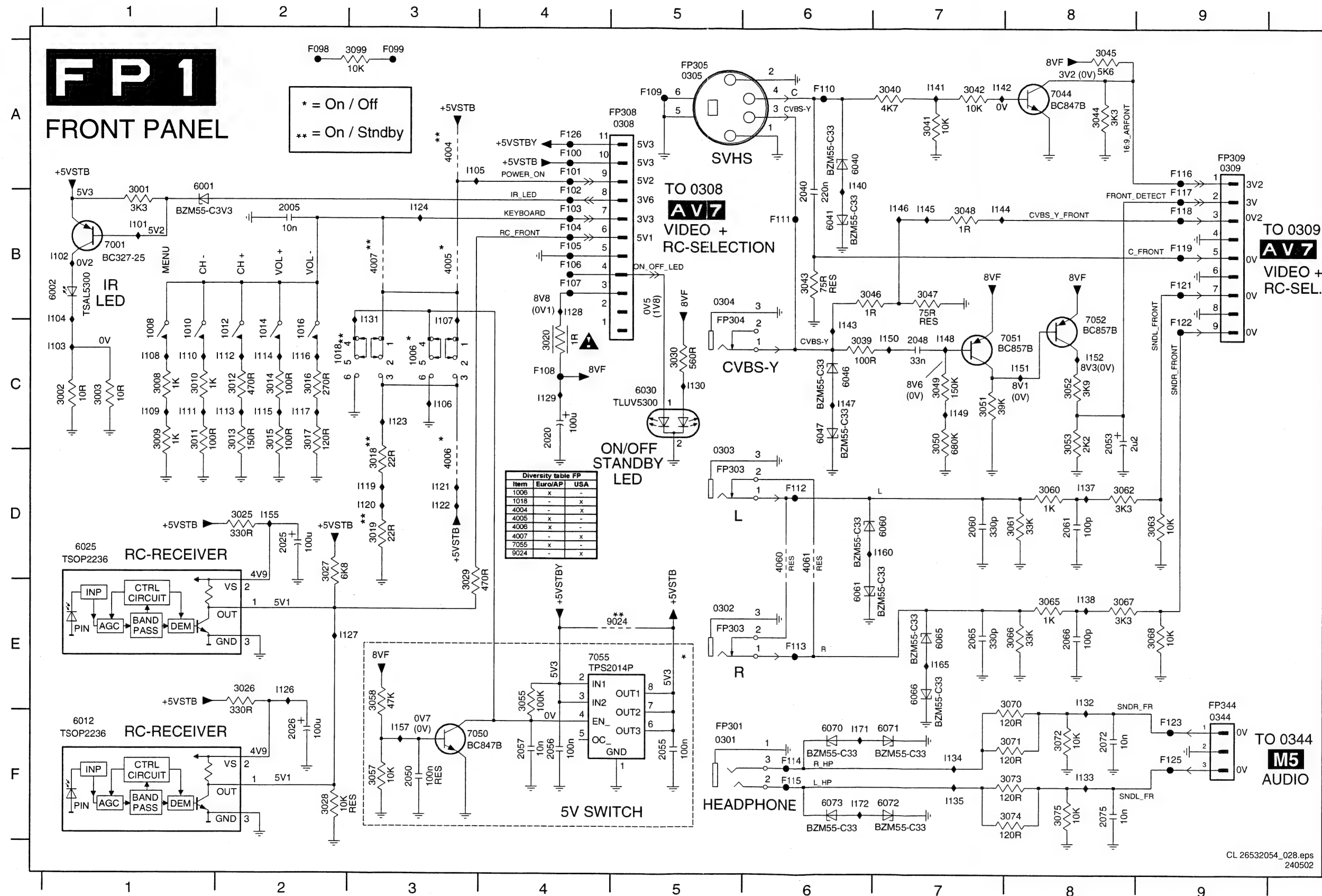


0002 C2
0003 C3
2000 E2
2001 E3
2002 C2
2003 C3
3000 E3
3001 E3
3002 E3
3003 E2
3004 B2
3999 E3
4000 B3
4001 B3
4002 B3
4003 D3
5000 C2
5001 C2
7000 B2
7001 E3
7002 D3

3122 123 57286

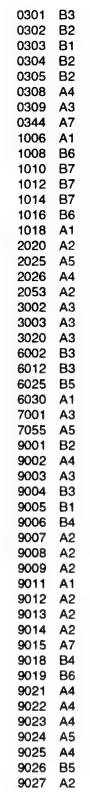


Front Panel



0301 F5	4061 D6	I145 B7
0302 E5	6001 B1	I146 B7
0303 D5	6002 B1	I147 C6
0304 B5	6012 F1	I148 C7
0305 A5	6025 D1	I149 C7
0308 A5	6030 C5	I150 C7
0309 A9	6040 A6	I151 C8
0344 F9	6041 B6	I152 C8
1006 C3	6046 C6	I155 D2
1008 C1	6047 C6	I157 F3
1010 C1	6060 D7	I160 D7
1012 C2	6061 E6	I165 E7
1014 C2	6065 E7	I171 F6
1016 C2	6066 E7	I172 F6
1018 C2	6070 F6	
2005 B2	6071 F7	
2020 C4	6072 F7	
2025 D2	6073 F6	
2026 F2	7001 B1	
2040 B6	7044 A8	
2048 C7	7050 F3	
2050 F3	7051 C7	
2053 C8	7052 B8	
2055 F5	7055 E4	
2056 F4	9024 E5	
2057 F4	F098 A2	
2060 D7	F099 A3	
2061 D8	F100 A4	
2065 E7	F101 A4	
2066 E8	F102 B4	
2072 F8	F103 B4	
2075 F8	F104 B4	
3001 B1	F105 B4	
3002 C1	F106 B4	
3003 C1	F107 B4	
3008 C1	F108 C4	
3009 C1	F109 A5	
3010 C1	F110 A6	
3011 C1	F111 B6	
3012 C2	F112 D6	
3013 C2	F113 E6	
3014 C2	F114 F6	
3015 C2	F115 F6	
3016 C2	F116 A9	
3017 C2	F117 B9	
3018 D3	F118 B9	
3019 D3	F119 B9	
3020 C4	F121 B9	
3025 D2	F122 C9	
3026 E2	F123 F9	
3027 D2	F125 F9	
3028 F2	F126 A4	
3029 D3	I101 B1	
3030 C5	I102 B1	
3039 C6	I103 C1	
3040 A7	I104 B1	
3041 A7	I105 A3	
3042 A7	I106 C3	
3043 B6	I107 C3	
3044 A8	I108 C1	
3045 A8	I109 C1	
3046 B6	I110 C1	
3047 B7	I111 C1	
3048 B7	I112 C2	
3049 C7	I113 C2	
3050 C7	I114 C2	
3051 C7	I115 C2	
3052 C8	I116 C2	
3053 C8	I117 C2	
3055 E4	I119 D3	
3057 F3	I120 D3	
3058 E3	I121 D3	
3060 D8	I122 D3	
3061 D8	I123 C3	
3062 D8	I124 B3	
3063 D9	I126 E2	
3065 E8	I127 E3	
3066 E8	I128 B4	
3067 E8	I129 C4	
3068 E9	I130 C5	
3070 E8	I131 B3	
3071 F8	I132 E8	
3072 F8	I133 F8	
3073 F8	I134 F7	
3074 F8	I135 F7	
3075 F8	I137 D8	
3099 A3	I138 E8	
4004 A3	I140 A6	
4005 B3	I141 A7	
4006 D3	I142 A7	
4007 B3	I143 C6	
4060 D6	I144 B7	

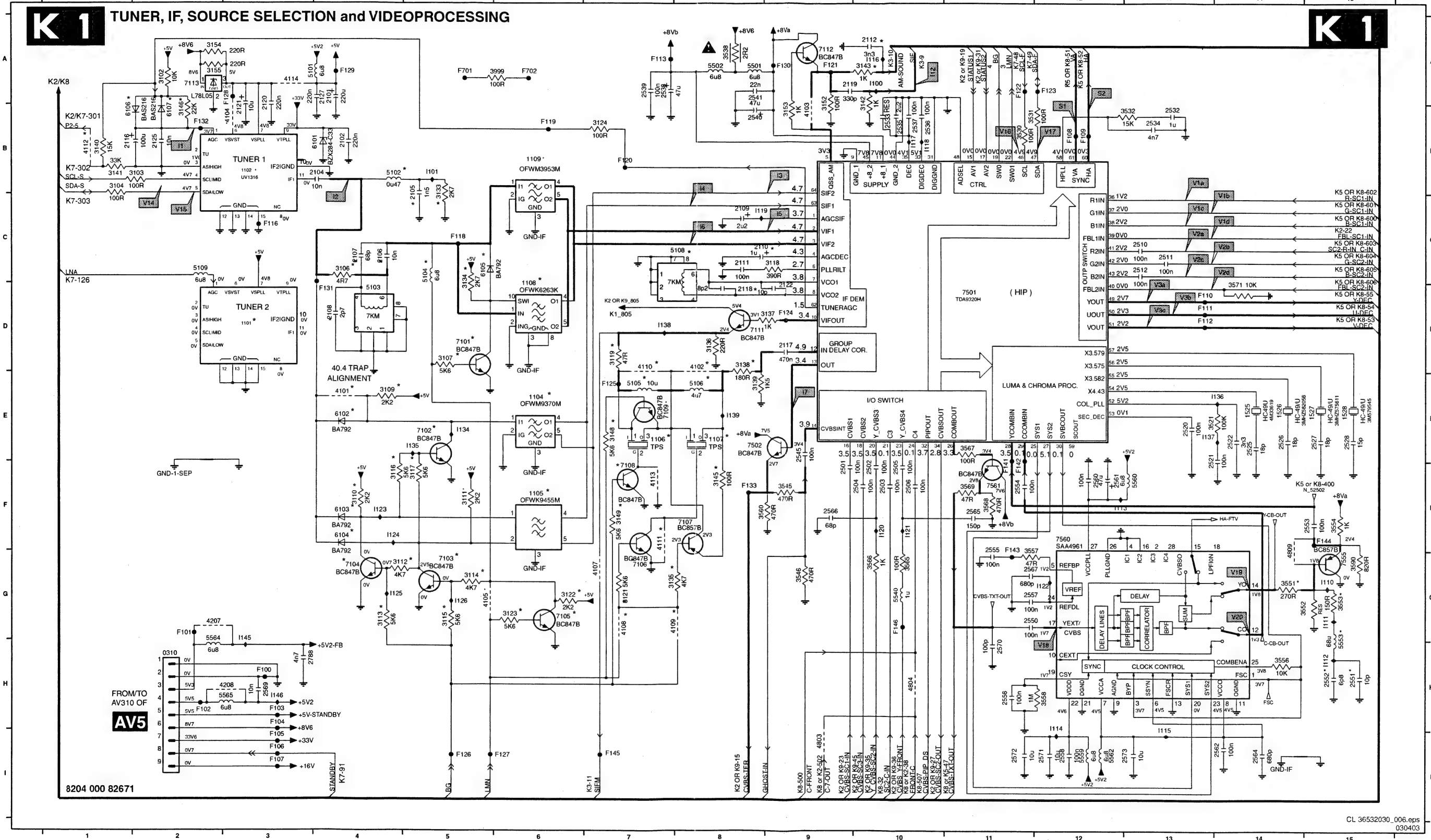
Top Side



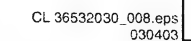
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2056	43	3062	67
2057	44	3063	67
2060	87	3065	66
2061	87	3066	67
2065	86	3067	67
2066	87	3068	67
2072	84	3070	64
2073	84	3071	64
3001	45	3072	64
3008	82	3073	65
3009	82	3074	65
3010	81	3075	65
3011	81	3099	A1
3012	81	4004	A4
3013	81	4005	A4
3014	81	4006	A7
3016	82	4060	67
3017	82	4061	67
3018	87	4062	67
3019	87	4063	65
3020	87	4064	A7
3026	84	6001	A5
3027	84	6040	65
3028	84	6041	66
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3044	86	6071	65
3045	86	6072	65
3046	86	6074	65
3047	86	6076	65
3048	86	7050	67
3049	86	7051	66
3050	86	7052	66
3051	86		
3052	86		
3053	86		

Small Signal Board: Tuner IF, Source Selection and Video Processing

0310 H2	1109 B6	2105 B5	2116 B1	2127 A4	2511 C13	2528 E15	2539 A7	2554 F11	2564 I14	2573 I13	3110 F4	3118 C9	3135 G7	3143 A10	3155 A2	3551 G14	3565 G10	4101 E4	4110 D7	4804 H10	5108 C7	5562 I12	6106 B1	7107 F8	7555 G15	F105 I3	F113 A7	F124 D9	F132 B2	F701 A5	I114 H12	I122 G12	I137 E13
1101 D3	1525 E14	2106 C4	2117 D9	2501 F9	2512 C13	2532 B13	2540 B8	2555 G11	2565 F11	2788 H3	3111 F5	3119 D7	3136 D8	3145 F8	3521 E13	3552 G15	3566 G10	4102 D8	4111 F7	4809 F14	5109 C2	5564 H2	6107 B2	7108 F7	7560 F12	F125 E7	F133 F8	F702 A6	I115 H13	I123 F4	I138 D7		
1102 B3	1526 E14	2107 C4	2118 D8	2502 F10	2520 E13	2533 B10	2541 A8	2556 H11	2566 F9	3102 A2	3112 G4	3121 G7	3137 D9	3146 B2	3530 B11	3553 G15	3567 E11	4103 B9	4112 B1	5101 A3	5501 A8	5565 H3	7101 D5	7109 E7	7561 F11	F107 I3	F118 C5	F126 I5	F141 F11	I100 A10	I116 A10	I124 F4	
1104 E6	1527 E15	2108 D4	2119 A9	2503 F10	2521 E14	2534 B13	2545 E9	2557 G11	2567 G11	3103 B2	3113 G4	3122 G6	3138 D8	3148 E7	3531 B11	3554 F15	3568 F11	4104 B3	4113 F7	5102 B4	5502 A8	5501 B4	7102 E5	7111 D8	F100 H3	F108 B12	F119 B6	F127 I6	F142 F11	I101 B5	I117 B10	I125 G4	
1105 F6	1528 E15	2109 C8	2120 A3	2504 F10	2522 E14	2535 B10	2550 G11	2558 I12	2569 H3	3104 B1	3114 G5	3123 G6	3139 E8	3149 F7	3532 B13	3556 H14	3569 F11	4105 G5	4114 A3	5103 D4	5540 G10	6102 E4	7103 G5	7112 A9	F101 G2	F109 B12	F120 B7	F128 A3	F143 G11	I110 G15	I118 B10	I126 G5	
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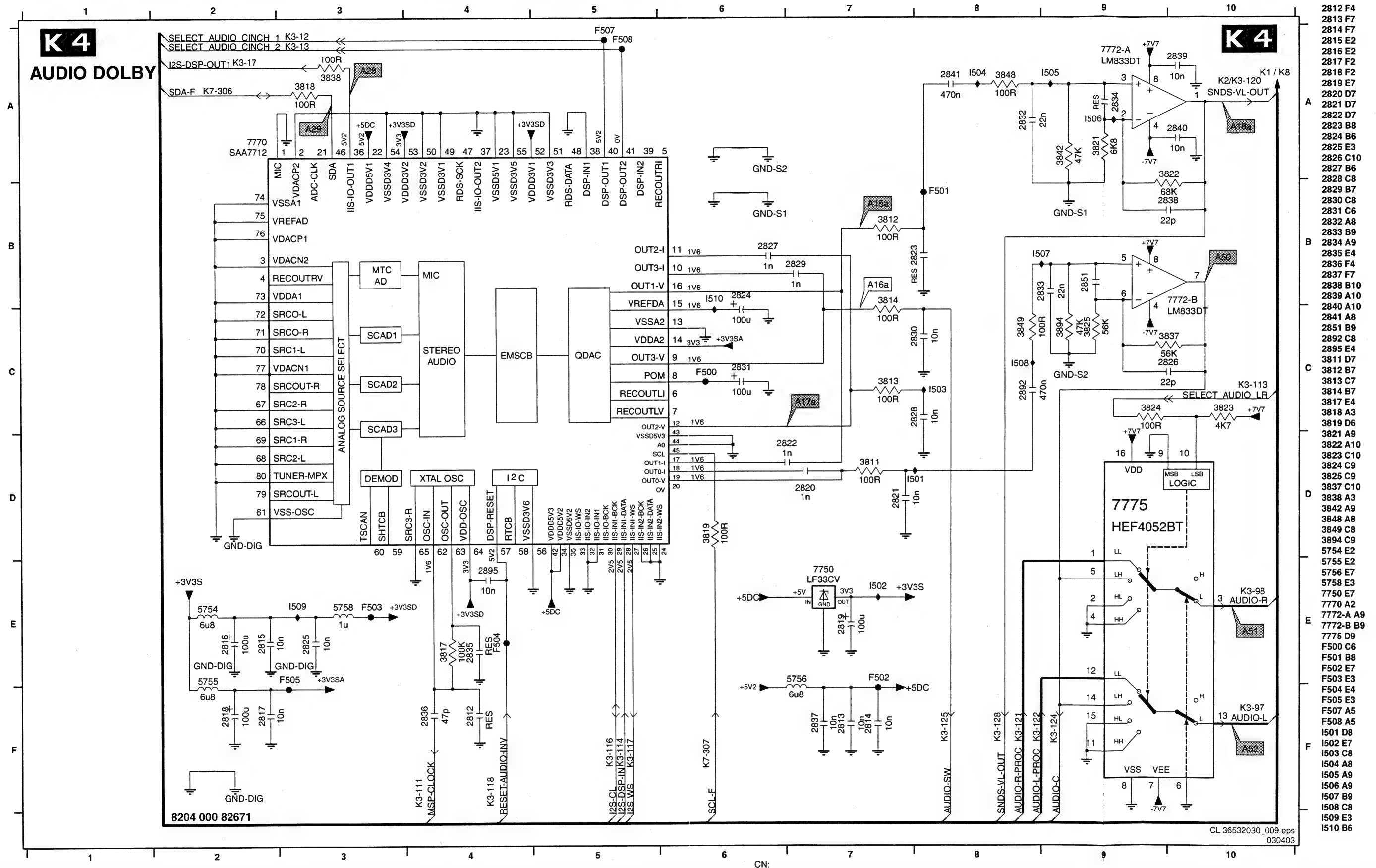


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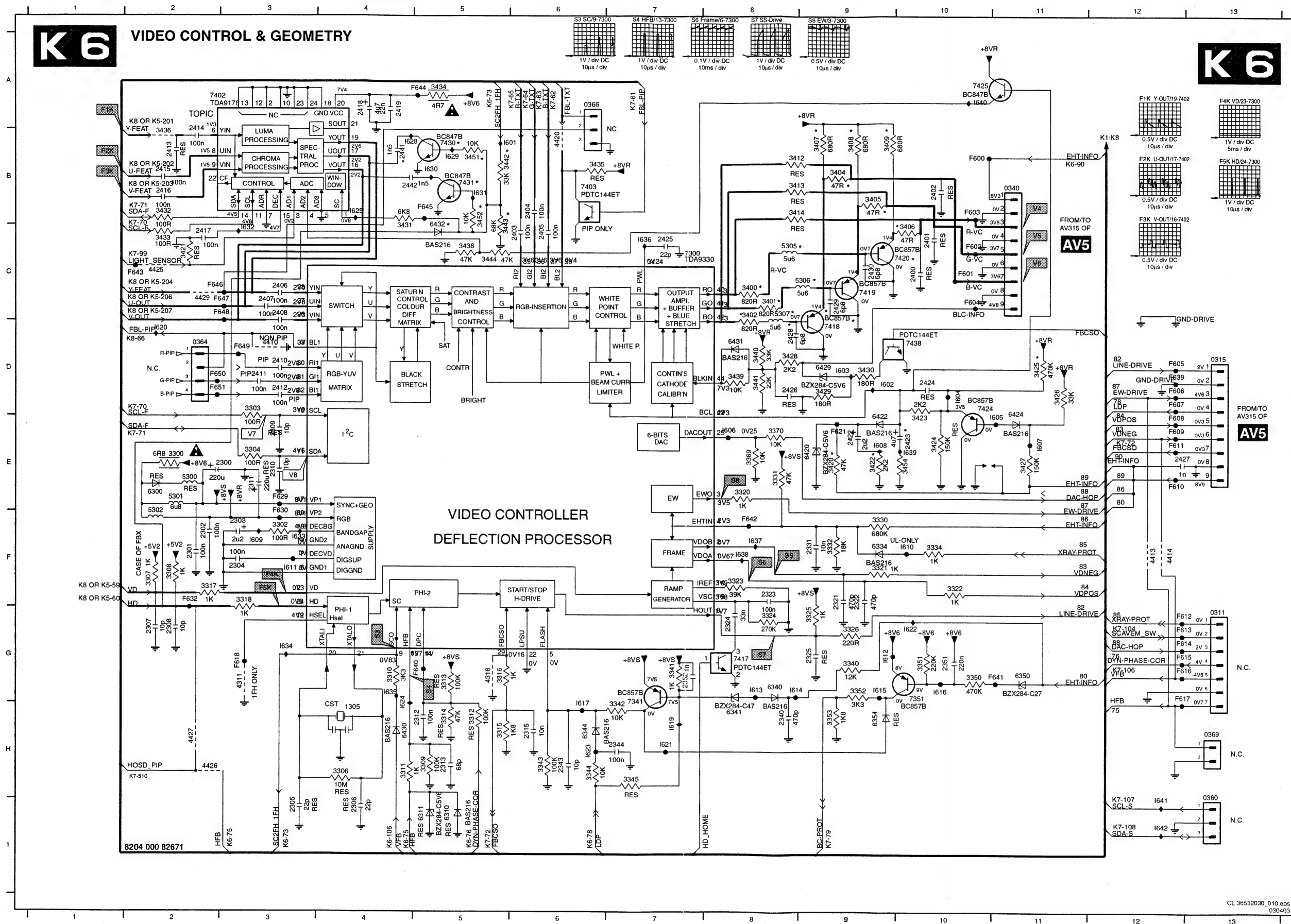
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K 4
AUDIO DOLBY



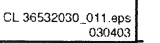
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Small Signal Board: Video Control and Geometry

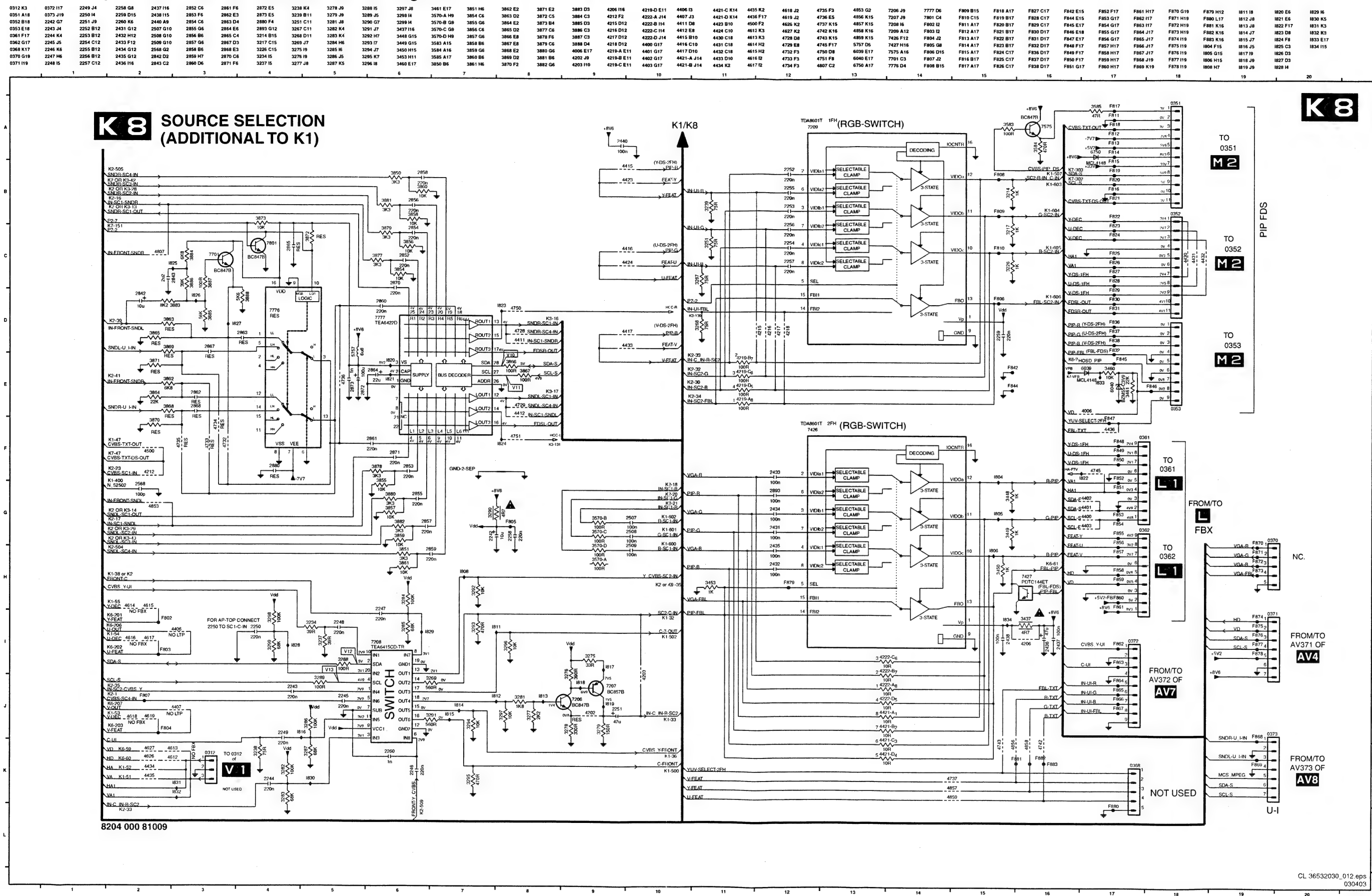


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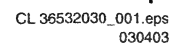
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K 7

Small Signal Board: Source Selection Add. to Diagram K1



1 2 3 4 5



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Part 2
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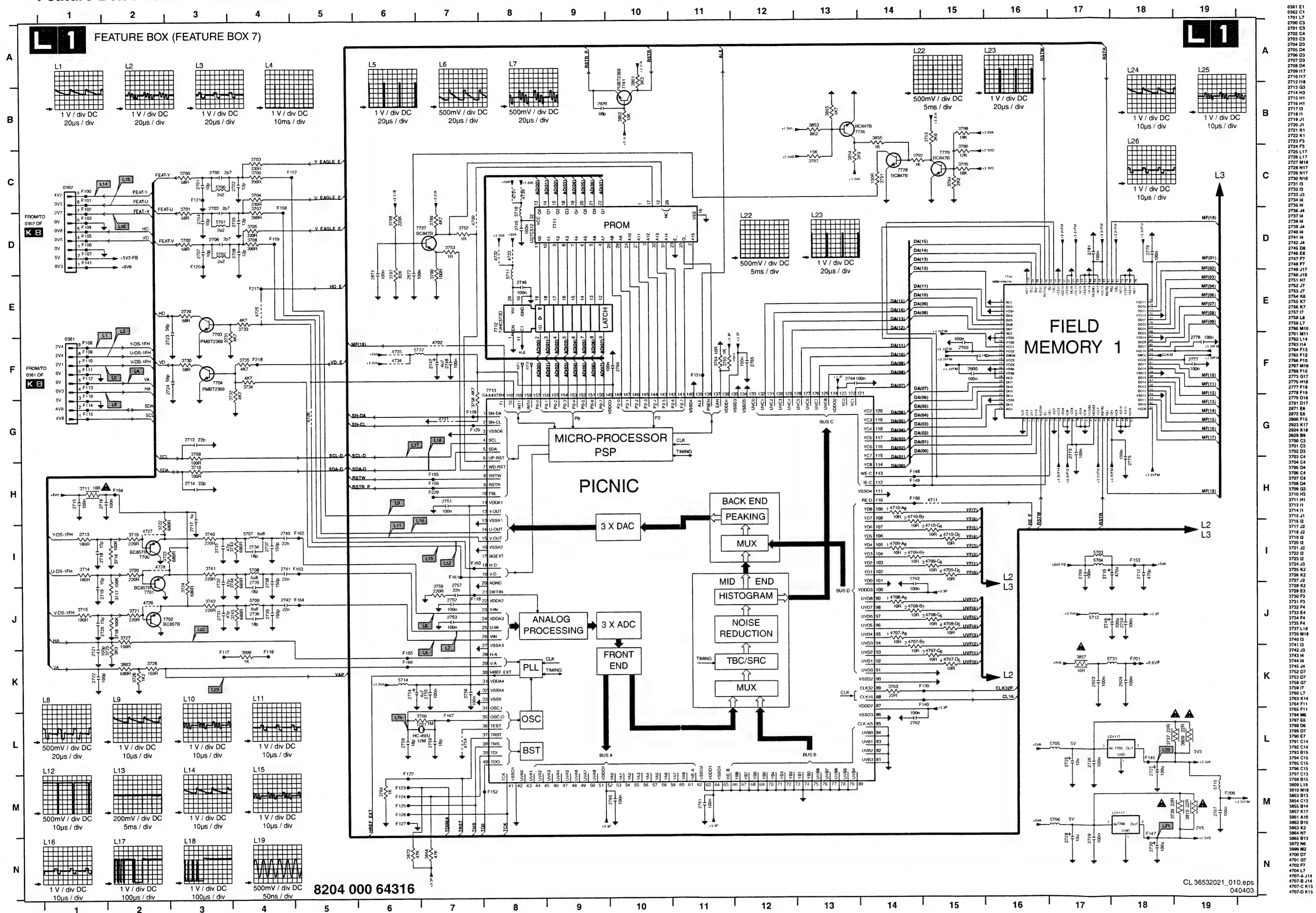
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	2228 F4	3219 F3	4614 C2	
I	2229 F4	3220 F2	4616 C2	
	2235 F4	3221 F1	4610 C2	
	2300 A2	3222 F1	4700 B4	
	2302 A1	3223 F1	4701 B4	
	2303 A2	3224 F1	4732 C2	
	2305 A1	3225 F2	4733 B2	
	2306 A2	3227 F2	4734 C2	
	2311 A1	3230 F1	4735 B2	
	2313 A1	3231 F2	4736 C2	
	2323 A1	3232 F1	4745 E1	
J	2343 A1	3233 C3	4803 A4	
	2409 A1	3235 F1	4804 C4	
	2401 A1	3238 F1	4805 C4	
	2402 A1	3240 F1	4806 C4	
	2403 A1	3241 F1	4809 E1	
	2404 A1	3242 F1	4812 C3	
	2405 A1	3243 F1	4813 C3	
	2418 A2	3244 F1	5002 A4	
	2419 A2	3245 F1	5101 D6	
	2422 A1	3246 F1	5102 E5	
K	2423 A1	3250 F2	5103 D5	
	2427 A1	3256 F3	5105 E5	
	2441 A2	3257 F3	5106 E4	
	2442 A2	3258 F4	5300 A2	
	2532 E4	3272 F4	5301 A2	
	2534 D4	3280 F4	5302 A2	
	2535 E3	3290 D1	5501 F5	
	2536 E4	3300 A3	5502 F5	
	2537 E3	3306 A1	5553 E1	
	2538 E5	3323 A1	5559 E2	
L	2540 E5	3343 A1	5590 E2	
	2550 E1	3413 A1	5562 E2	
	2552 E1	3414 A1	5563 E2	
	2553 E1	3421 A3	5585 E2	
	2554 E1	3422 A1	5751 D6	
	2581 E1	3434 A3	5752 B4	
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	2587 E1	3438 A1	5754 C5	
	2589 A2	3439 A1	5755 C5	

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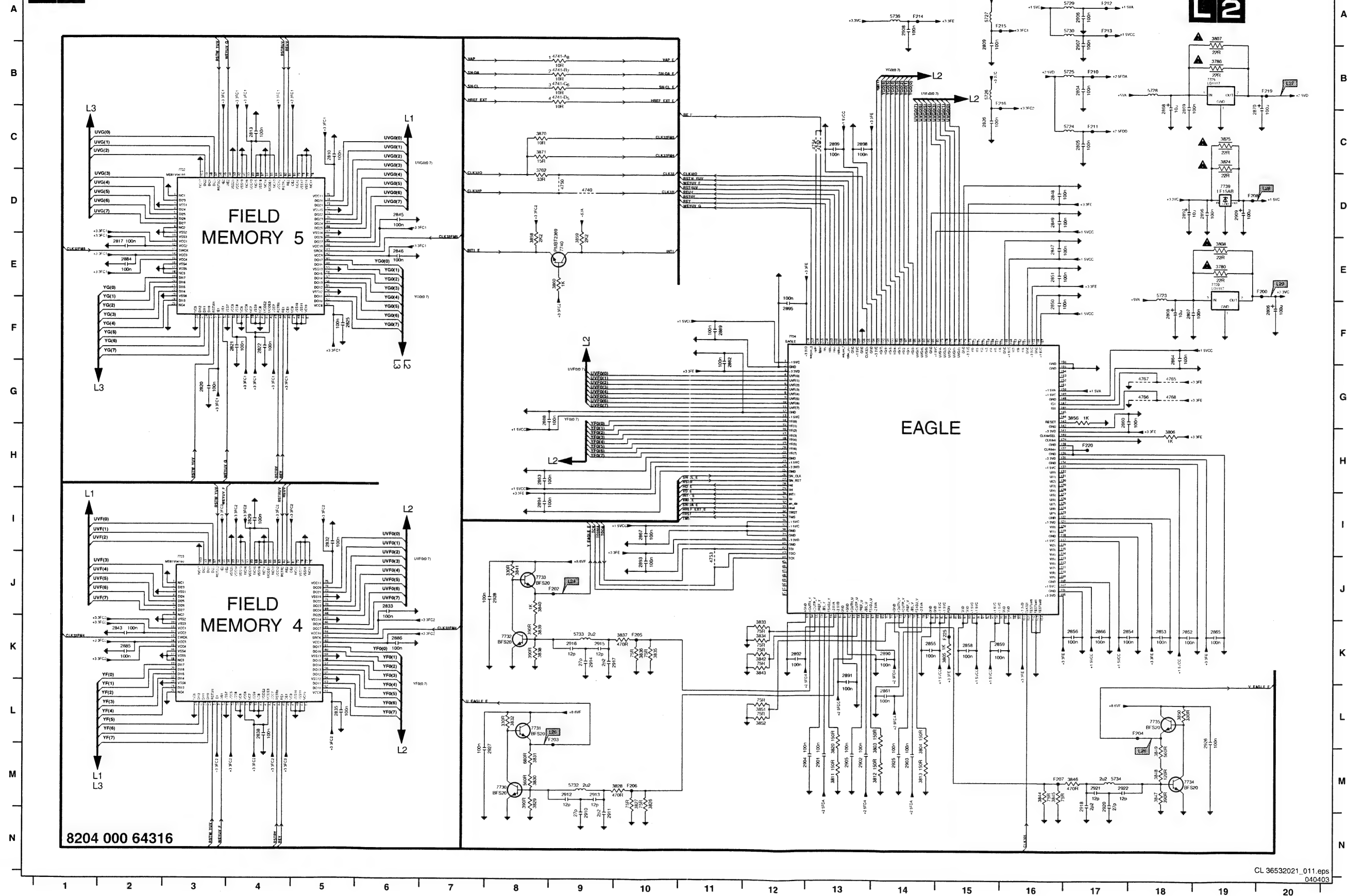


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Feature Box 7 Panel: Feature Box

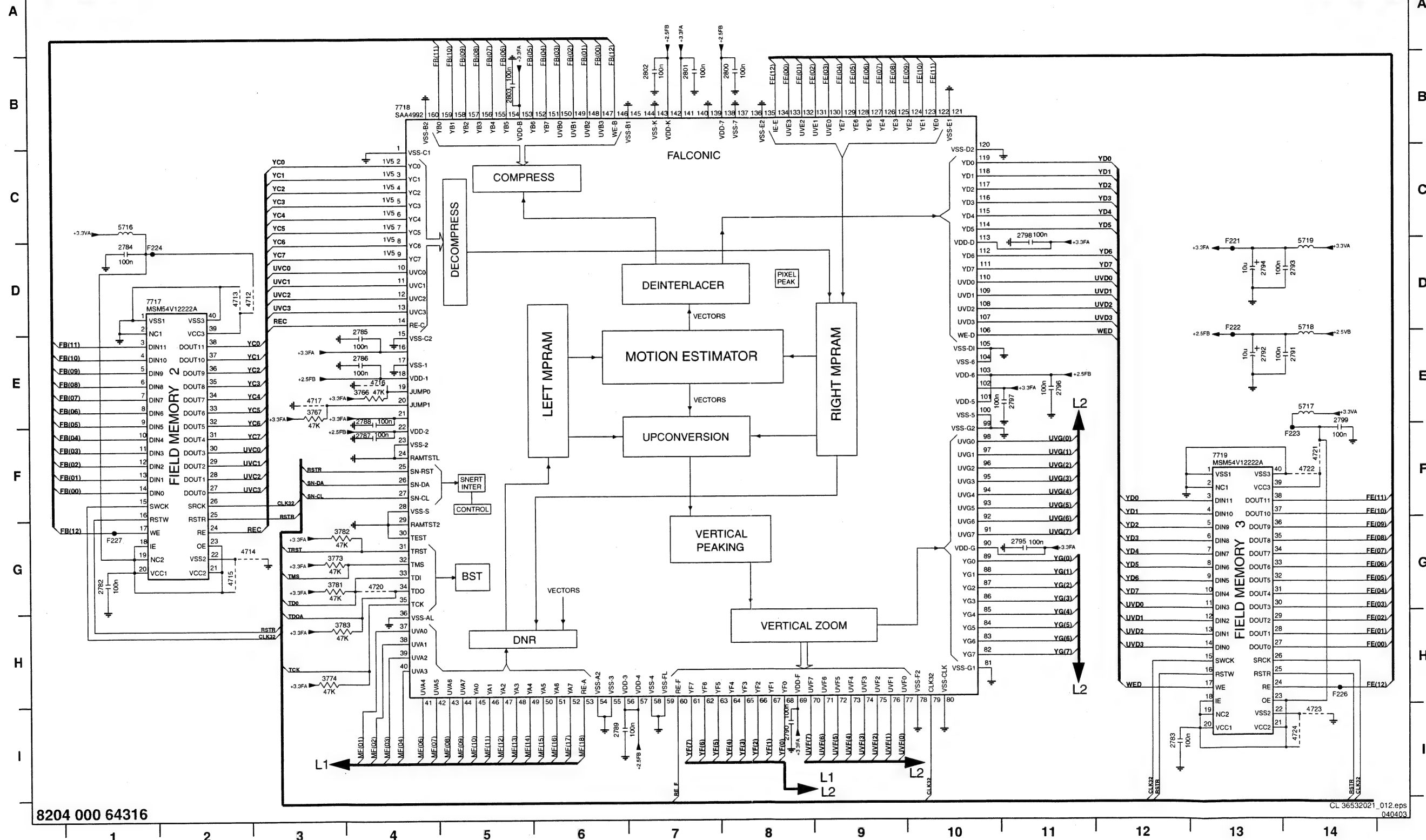


Feature Box 7 Panel: Eagle

L2 EAGLE (FEATURE BOX 7) (ONLY PRESENT IN PIXEL-PLUS SETS)

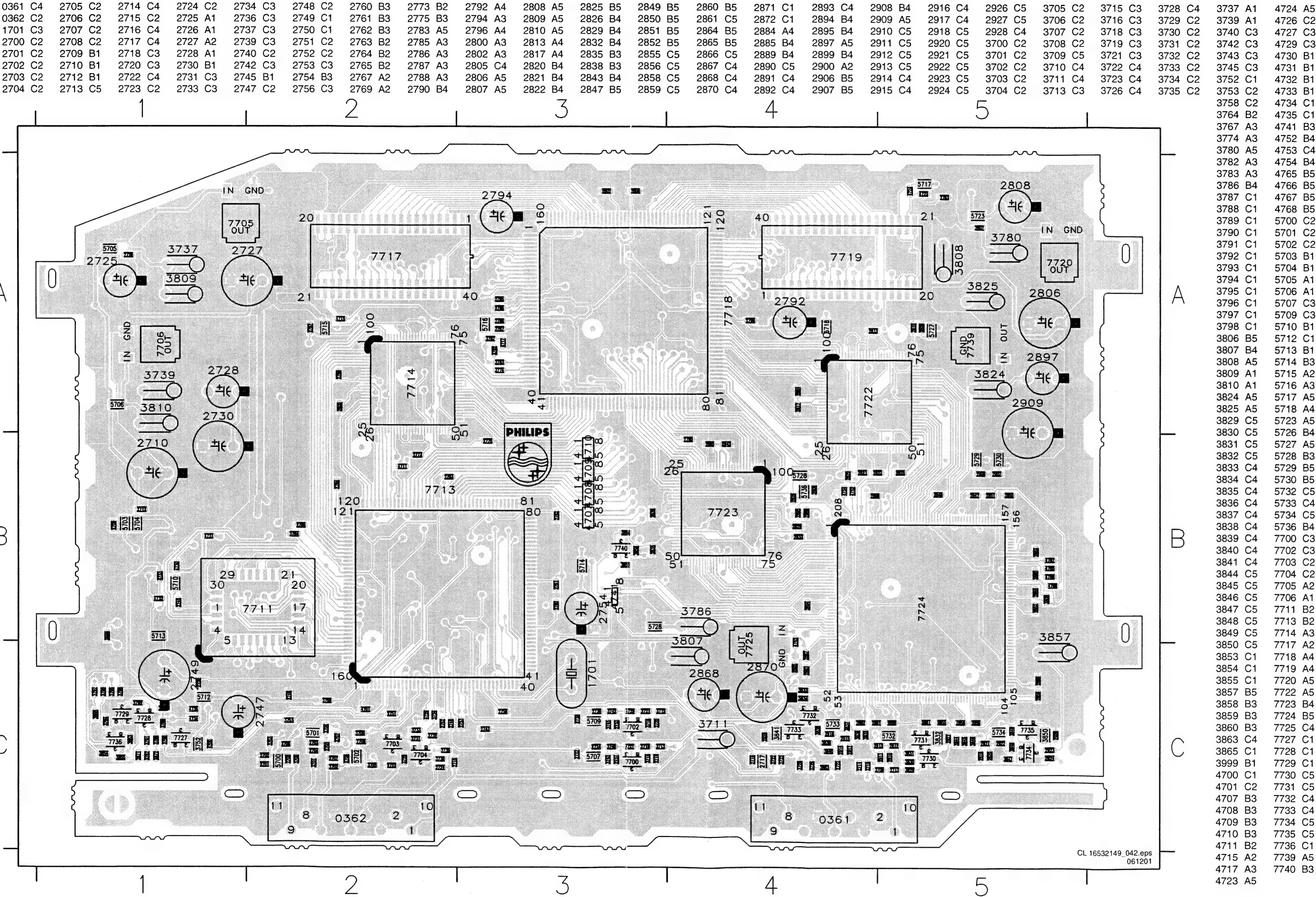
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2805 C17 7739 D19
2806 F20 7740 E9
2807 F18 F200 E20
2808 F18 F202 J9
2809 A15 F203 L9
2810 C5 F204 L18
2813 C4 F205 K10
2817 E2 F206 M10
2820 G3 F207 M16
2821 F4 F208 D19
2822 F4 F210 B17
2825 F5 F211 C17
2826 C15 F212 A17
2829 I4 F213 A17
2832 I5 F214 A14
2833 J6 F215 A15
2835 L5 F216 B16
2838 L4 F219 G20
2843 K2 F220 H17
2845 D6 F225 K15
2846 E6
2847 E18
2848 D16
2849 D16
2850 F16
2851 E16
2852 K18
2853 K18
2854 K17
2855 K14
2856 K17
2858 K15
2859 K15
2860 G17
2861 L14
2862 F11
2863 H9
2864 F18
2865 K19
2866 K17
2867 I10
2868 B18
2869 B18
2870 B19
2884 E2
2885 K2
2886 K8
2888 D8
2889 F11
2890 K14
2891 K13
2892 K12
2893 J10
2894 B6
2895 F12
2896 D19
2897 D18
2898 C13
2899 C13
2901 M13
2902 M13
2903 M14
2904 M13
2905 M13
2906 A17
2907 A17
2908 A14
2909 D16
2910 N9
2911 N9
2912 M9
2913 M9
2914 K8
2915 K8
2916 K8
2917 K8
2918 M17
2920 M17
2921 M17
2922 M17
2923 M14
2928 L18
2927 M8
2928 J8
2928 D8
2928 E18
2928 B18
2933 M14
2934 M14
2935 K15
2936 K15
2937 A18
2938 E18
2939 M8
2940 M8
2941 M8
2942 K12
2943 K12
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2999 M12
3000 M12

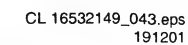
Feature Box 7 Panel: Falconic

L3 FALCONIC (FEATURE BOX 7)**L3**

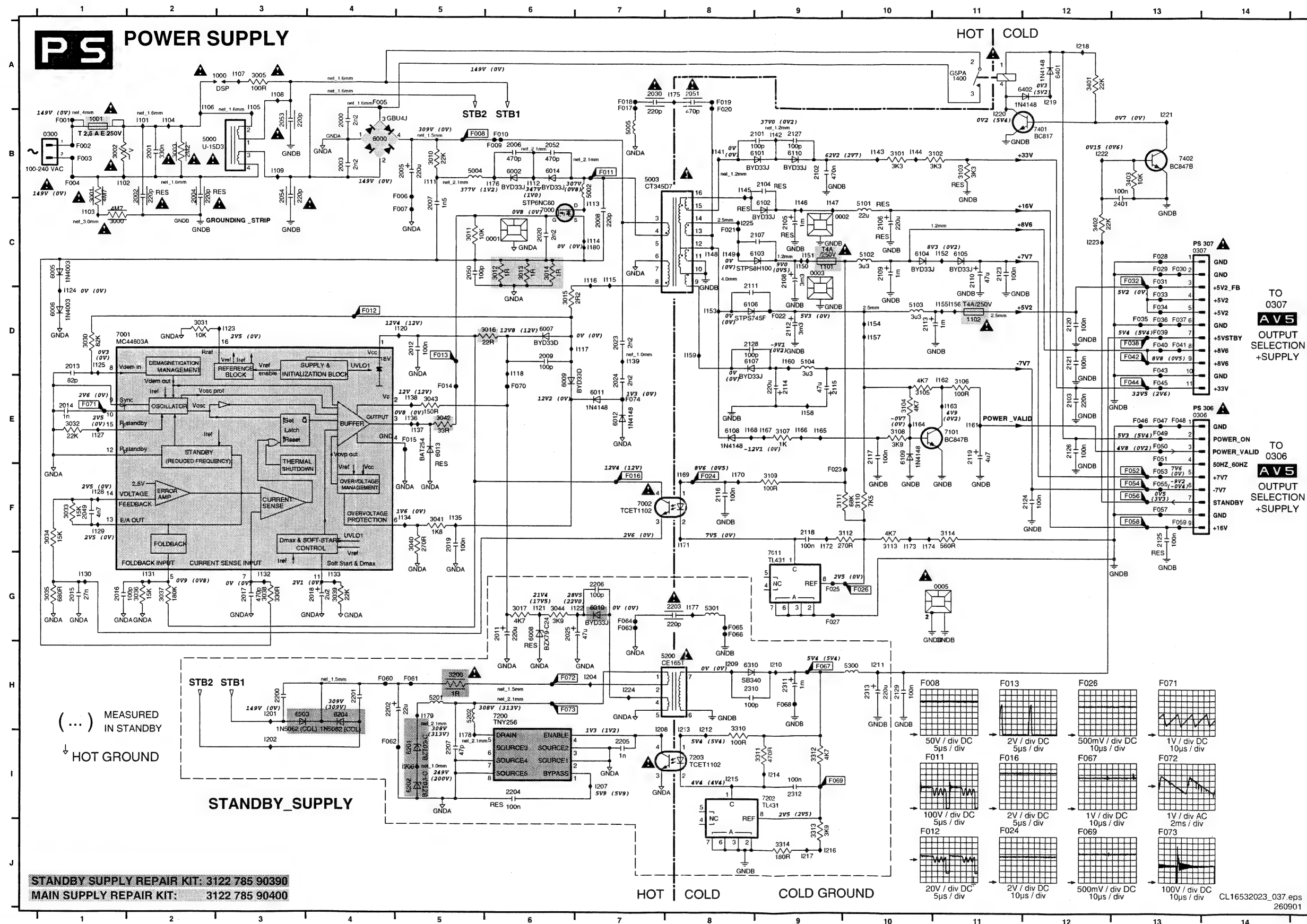
2782 G1
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2784 D1
2785 D4
2786 E4
2787 F4
2788 E4
2789 I6
2790 I8
2791 E14
2792 E13
2793 D14
2794 D13
2795 G11
2796 E11
2797 E11
2798 C11
2799 E14
2800 B8
2801 B7
2802 B7
2803 B5
2786 E4
2787 E3
2773 G3
2774 H3
2781 G3
2782 G3
2783 H3
2712 D3
2713 D2
2714 G2
2715 G2
2717 E3
2720 G4
2721 F14
2722 F14
2723 H4
2724 H14
2716 C1
2717 E14
2718 D14
2719 D14
2717 D1
2718 B4
2719 F13
2721 D13
2722 D13
2723 F14
2724 D1
2726 H14
2727 G1

Layout Feature Box 7 Panel (Top View)



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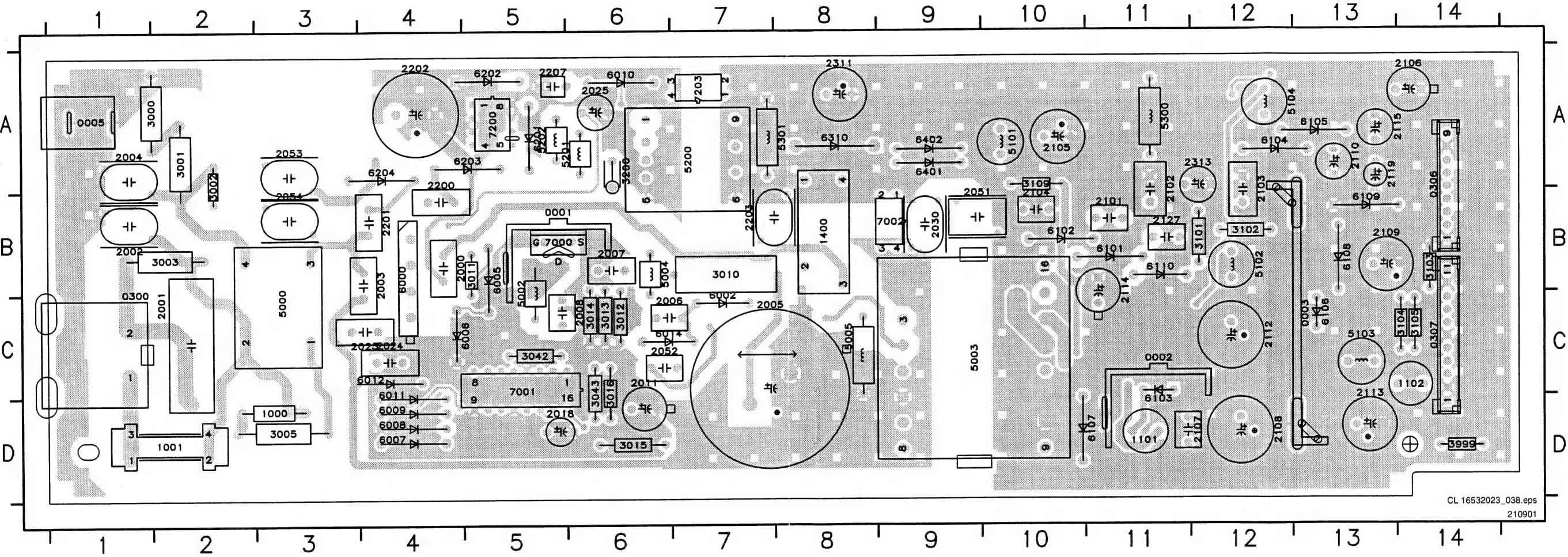
Power Supply



0001 C6	3112 F10	F057 F13
0002 C9	3113 F10	F058 F13
0003 C9	3114 F11	F059 F13
0005 I12	3200 H5	F060 H4
0300 B1	3310 H8	F061 H5
0306 E13	3311 H9	F062 I4
0307 C13	3312 H9	F063 G7
1000 A3	3313 J9	F064 G7
1001 B1	3314 J9	F065 G8
1101 C9	3401 A12	F066 G8
1102 D11	3402 C12	F067 H9
1400 A11	3403 B13	F068 H9
2000 B4	3999 I11	F069 I9
2001 B2	5000 B2	F070 E6
2002 B2	5002 B7	F071 E1
2003 B4	5003 B7	F072 H6
2004 B2	5004 B5	F073 H6
2005 B5	5005 B7	F074 E7
2006 B6	5101 C10	F996 I11
2007 C5	5102 C10	F997 I11
2008 C7	5103 D10	F998 I11
2009 D6	5104 D9	F999 I11
2011 G6	5200 H7	I101 B2
2012 D5	5201 H5	I102 B1
2013 D1	5202 H5	I103 C1
2014 E1	5300 H10	I104 B2
2015 G1	5301 G8	I105 A3
2016 G10	6000 B4	I106 A2
2017 G3	6002 B6	I107 A3
2018 G4	6005 C1	I108 A3
2019 F5	6006 D1	I109 B3
2020 C6	6007 D6	I111 B5
2023 D7	6008 G6	I112 B6
2024 E7	6009 E5	I113 C7
2025 G6	6010 G7	I114 C7
2030 A7	6011 E7	I115 C7
2049 F1	6012 E7	I116 C7
2050 C5	6013 E5	I117 D7
2051 A8	6014 B6	I118 D6
2052 B2	6101 B9	I120 D5
2053 B3	6102 C9	I121 G6
2054 B3	6103 C9	I122 G7
2101 B9	6104 C10	I123 D3
2102 B9	6105 C11	I124 D1
2103 E12	6106 D8	I125 D1
2104 B6	6107 D8	I127 E1
2105 C9	6108 E8	I128 F1
2106 C10	6109 E10	I129 F1
2107 C9	6110 B9	I130 G1
2108 C9	6201 E5	I131 G2
2109 C10	6202 B5	I132 G3
2110 C11	6203 H3	I133 G4
2111 C8	6204 H4	I134 F5
2112 D9	6310 H8	I135 F5
2113 D10	6401 A12	I136 E5
2114 E9	6402 A12	I137 E5
2115 E9	7000 C6	I138 E5
2116 F8	7001 D1	I139 D7
2117 E10	7002 F7	I141 B8
2118 F9	7011 G9	I142 B9
2119 E11	7101 E11	I143 B10
2120 D12	7200 H6	I144 B10
2121 D12	7202 B8	I145 B8
2123 C11	7203 I8	I146 C9
2124 F12	7401 B12	I147 C9
2125 F13	7402 B13	I148 C8
2126 E12	F001 B1	I149 C8
2127 B6	F002 B1	I167 E9
2128 D8	F003 B1	I168 E8
2129 H10	F004 B1	I169 F8
2200 H3	F005 A4	I170 F8
2201 H4	F006 B5	I171 F8
2202 H4	F007 C5	I172 F9
2203 G8	F008 B5	I173 F10
2204 I5	F009 B6	I174 F10
2205 I7	F010 B6	I175 A8
2206 G7	F011 B7	I176 B6
2207 I5	F012 D4	I177 G8
2310 H8	F013 D5	I178 I5
2311 H9	F014 E5	I179 H5
2312 I8	F015 E5	I180 C7
2313 H10	F016 F7	I201 H3
2401 C13	F017 A7	I202 I3
3000 C1	F018 A7	I204 H7
3001 B1	F019 A8	I205 I5
3002 B1	F020 B8	I206 I5
3003 B2	F021 C8	I207 I7
3005 A3	F022 D9	I208 H8
3010 B5	F023 F9	I210 H9
3011 C5	F024 F8	I211 H10
3012 C6	F025 G9	I212 H8
3013 C6	F026 G10	I213 H8
3014 C8	F027 G8	I214 I9
3015 D6	F028 C13	I215 I9
3016 D6	F029 C13	I216 J9
3017 G6	F030 C13	I217 J9
3030 D1	F031 C13	I218 A12
3031 D2	F032 C13	I219 A12
3032 E1	F033 D13	I220 A11
3033 F1	F034 D13	I221 B13
3034 F1	F035 D13	I222 B12
3035 G1	F036 D13	I223 C12
3036 G2	F037 D13	I224 H7
3037 G2	F038 D13	I225 C8
3038 G3	F039 D13	
3039 G4	F040 D13	
3040 F5	F041 D13	
3041 F5	F042 D13	
3042 E5	F043 D13	
3043 E5	F044 E13	
3044 G6	F045 E13	
3101 B10	F046 E13	
3102 B11	F047 E13	
3103 B11	F048 E13	
3104 E10	F049 E13	
3105 E10	F050 E13	
3106 E11	F051 E13	
3107 E9	F052 F13	
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3110 F10	F055 F13	
3111 F9	F056 F13	

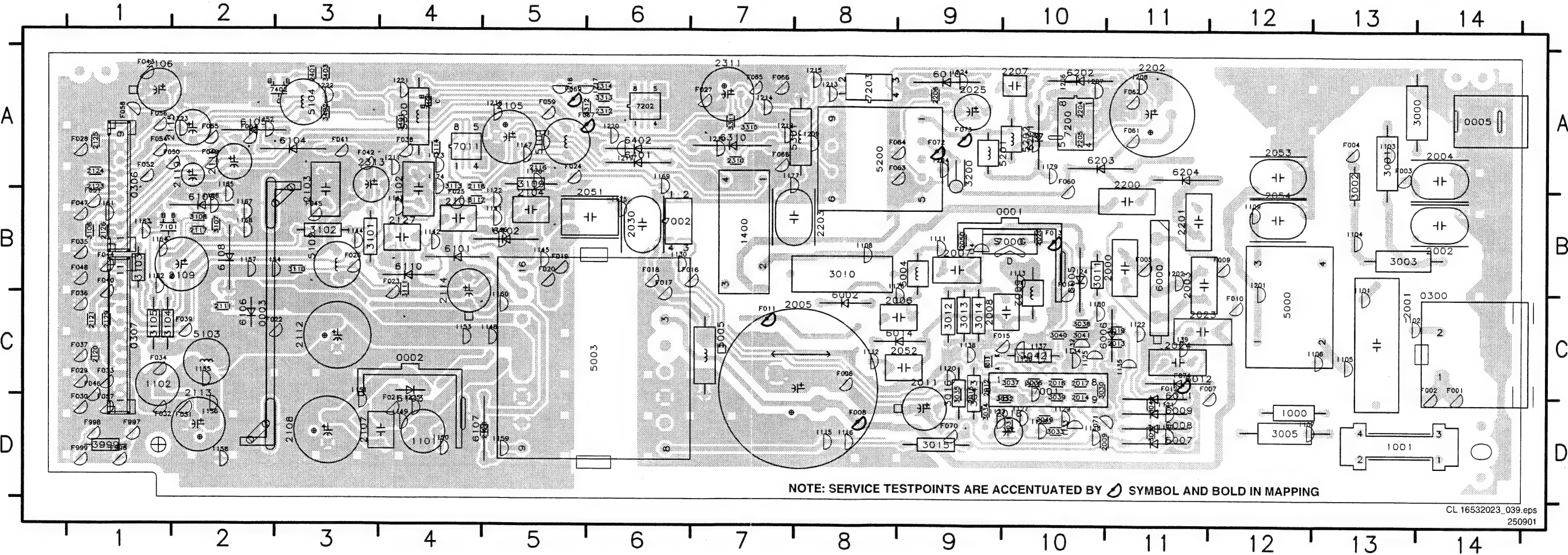
Layout Power Supply (Top Side)

0001 B5	2112 C12	6110 B11	2127 B11	6310 A8	2207 A5	7002 B9	3010 B7	2054 B3	6012 C4
0002 C11	3103 B14	6201 A5	2200 A4	6401 A9	2311 A8	7200 A5	3011 B5	2101 B11	6014 C6
0005 C13	3104 C14	1000 D3	2201 B4	6402 A9	2313 A12	7203 A7	3012 C6	2102 B11	6101 B11
0005 A1	3105 C14	1001 D2	5002 B5	7000 B5	3000 A1	2011 C6	3013 C6	2103 B12	6102 B10
0300 B1	3109 A10	1101 D11	5003 C9	2002 B1	3001 A2	2018 D5	6002 C7	2104 B10	6103 D11
0306 A14	3200 A6	1102 C14	5004 B6	2003 B4	5104 A12	2023 C4	6005 B5	3014 C6	6104 A12
0307 C14	3999 D14	1400 B8	5005 C8	2004 A1	5200 A7	2024 C4	6006 C5	3015 D6	
2105 A10	5000 C3	2000 B4	5101 A10	2005 C7	5201 A5	2025 A6	6007 D4	3016 C6	
2106 A14	6105 A13	2001 C2	5102 B12	2006 C6	5202 A5	2030 B9	6008 D4	3042 C5	
2107 D12	6106 C13	2113 C13	5103 C13	2007 B6	5300 A11	2051 B9	6009 D4	3043 C6	
2108 D12	6107 D11	2114 B11	6202 A5	2008 C6	5301 A8	3002 A2	6010 A6	3101 B12	
2109 B13	6108 B13	2115 A14	6203 A5	2202 A4	6000 B4	3003 B2	2052 C6	3102 B12	
2110 A13	6109 B13	2119 A13	6204 A4	2203 B7	7001 C5	3005 D3	2053 A3	6011 C4	

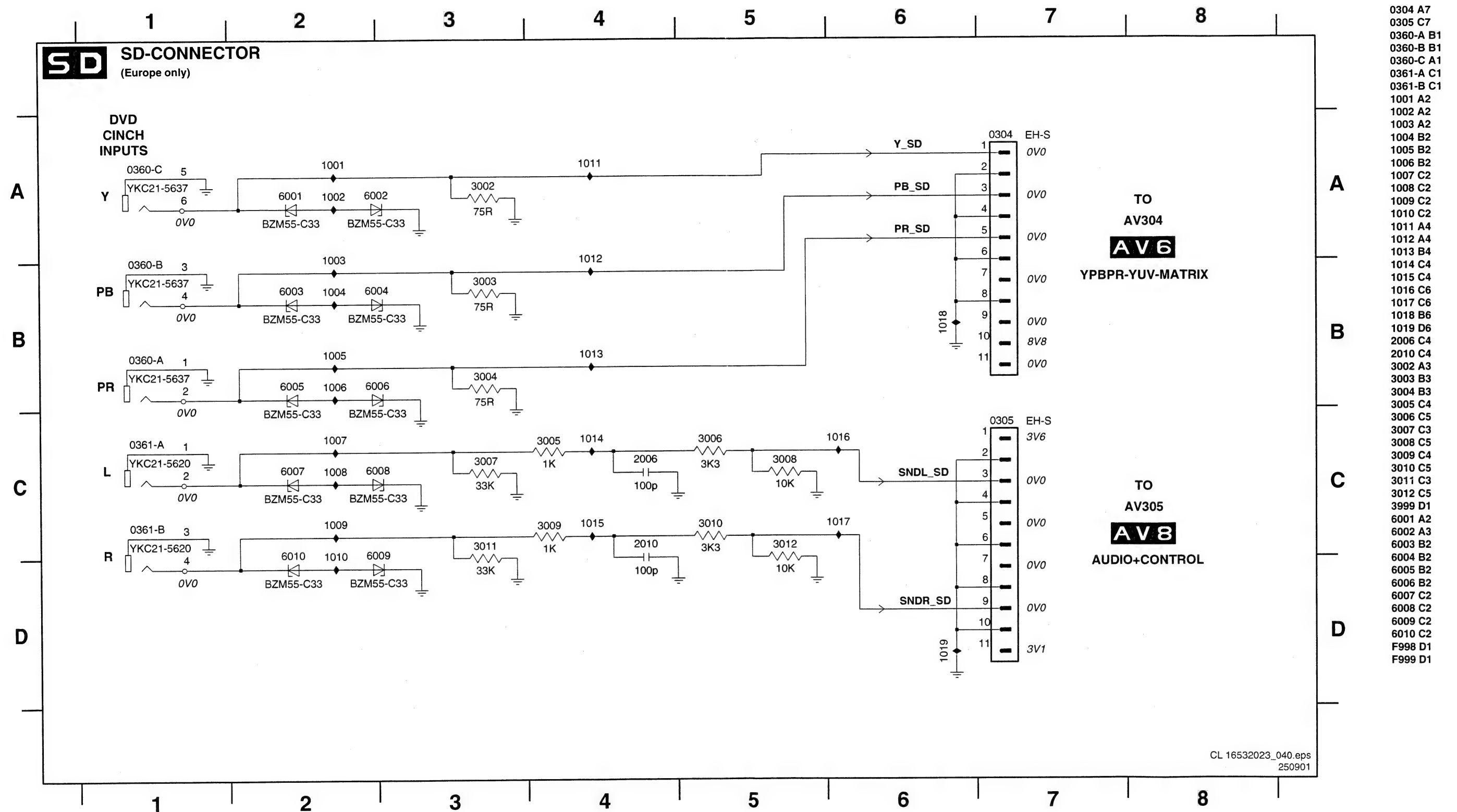


Layout Power Supply (Bottom Side)

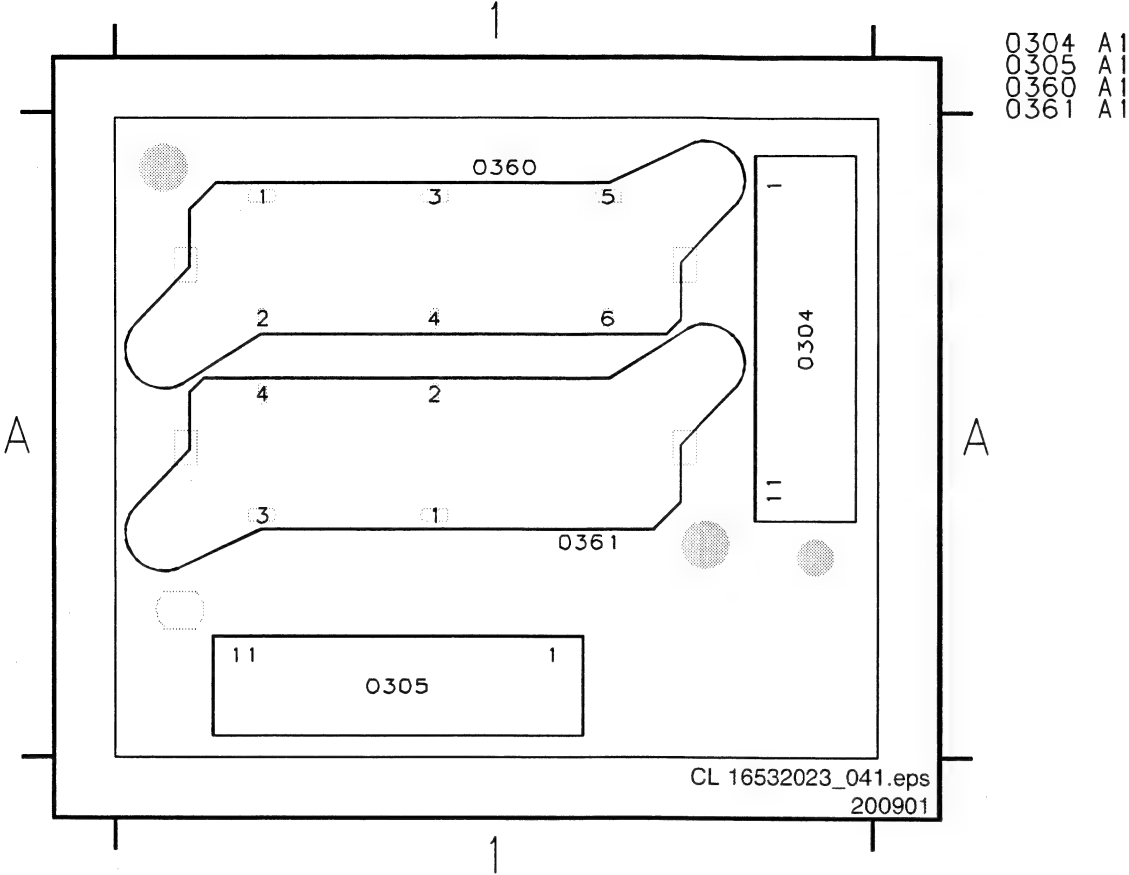
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0002	C4	2008	C9	2052	C9	2117	B2	2207	A10	3030	C10	3105	C1	3999	D1	6007	D11	6202	A10	F004	A13	F023	B4	F042	A3	F061	A11	I102	C13	I1221	A4	I138	C9	I158	D2	I177	A7	I218	A5
0003	C2	2009	D10	2053	A12	2118	A4	2310	A7	3031	D10	3106	B1	5000	C12	6008	D11	6203	A10	F005	B11	F024	A5	F043	A1	F062	A11	I103	A13	I1222	A3	I139	C11	I159	D5	I178	A10	I219	A6
0005	A14	2011	C9	2054	B12	2119	A2	2311	A7	3032	D10	3107	B2	5002	B10	6009	D11	6204	A11	F006	C8	F025	B4	F044	B1	F063	A8	I104	B13	I1223	A2	I141	B5	I160	C5	I179	A10	I220	A6
0300	B14	2012	C9	2101	B4	2120	C1	2312	A6	3033	D10	3108	B2	5003	C6	6010	A9	6310	A7	F007	C11	F026	B3	F045	B3	F064	A8	I105	C13	I1224	A9	I142	B4	I161	B1	I180	C10	I221	A4
0306	A1	2013	C11	2102	B4	2121	C1	2313	A3	3034	D9	3109	A5	5004	B9	6011	C11	6401	A6	F008	D8	F027	A7	F046	C1	F065	A7	I106	C13	I1225	D4	I143	B4	I162	B1	I201	B12	I222	A3
0307	C1	2014	C10	2103	B3	2123	A1	2401	A3	3035	C9	3110	B3	5005	C7	6012	C11	6402	A6	F009	B12	F028	A1	F047	B1	F066	A7	I107	D12	I123	D9	I144	B3	I163	B1	I202	B11	I223	A2
1000	D12	2015	C9	2104	B5	2124	A1	3000	A13	3036	C10	3111	B4	5101	A5	6013	C9	7000	B10	F010	C12	F029	C1	F048	B1	F067	A5	I108	B8	I124	B10	I145	B5	I164	B1	I204	A9	I224	A9
1001	D13	2016	C10	2105	A5	2125	A1	3001	A13	3037	C10	3112	B4	5102	B3	6014	C9	7001	C10	F011	C7	F030	D1	F049	A2	F068	A7	I109	B12	I125	C10	I146	B5	I165	A2	I206	A10	I225	D4
1101	D4	2017	C10	2106	A1	2126	B1	3002	A13	3038	C10	3113	A4	5103	C2	6101	B4	7002	B6	F012	C11	F031	D2	F050	A1	F069	A5	I111	B9	I127	D10	I147	A5	I166	B2	I207	A10		
1102	C1	2018	D10	2107	D3	2127	B4	3003	B13	3039	C10	3114	A4	5104	A3	6102	B5	7011	A4	F013	B10	F032	D1	F051	B1	F070	D9	I112	C8	I128	D10	I148	C5	I167	B2	I208	A11		
1400	B7	2019	C11	2108	D3	2128	D5	3005	D12	3040	C10	3200	A9	5200	A8	6103	D4	7101	B1	F014	B10	F033	C1	F052	A1	F071	D10	I113	B10	I129	D10	I149	D4	I168	B2	I209	A8		
2000	B11	2020	B10	2109	B2	2129	C1	3010	B8	3041	C10	3310	A7	5201	A10	6104	A3	7200	A10	F015	C9	F034	C1	F053	A2	F072	A9	I114	B9	I130	B6	I150	D4	I169	A6	I210	A7		
2001	C13	2023	C11	2110	A2	2200	A11	3011	B10	3042	C10	3311	A7	5202	A10	6105	A2	7202	A6	F016	B6	F035	B1	F054	A1	F073	A9	I115	D8	I131	C10	I151	C3	I170	A5	I211	A4		
2002	B14	2024	C11	2111	C2	2201	B11	3012	C9	3043	C9	3312	A6	5300	A4	6106	C2	7203	A8	F017	B6	F036	C1	F055	A2	F074	C11	I116	D8	I132	C10	I152	A2	I171	A5	I212	A7		
2003	B11	2025	A9	2112	C3	2202	A11	3013	C9	3044	D11	3313	A6	5301	A7	6107	D4	7401	A4	F018	B6	F037	C1	F056	A1	F996	D1	I117	D11	I133	D10	I153	C4	I172	B5	I213	A8		
2004	A14	2030	B6	2113	C2	2203	B8	3014	C9	3101	B3	3314	A6	6000	B11	6108	B2	7402	A3	F019	B5	F038	A4	F057	D1	F997	D1	I118	D10	I134	C10	I154	B2	I173	A4	I214	A7		
2005	C8	2049	D10	2114	B4	2204	A10	3015	D9	3102	B3	3401	A4	6002	C8	6109	B2	F001	C14	F020	B5	F039	C2	F058	A1	F998	D1	I120	C9	I135	C11	I155	C2	I174	A4	I215	A8		
2006	C9	2050	B9	2115	A1	2205	A10	3016	C9	3103	B1	3402	A3	6005	B10	6110	B4	F002	C14	F021	D4	F040	B1	F059	A5	F999	D1	I121	D11	I136	C10	I156	D2	I175	B6	I216	A5		



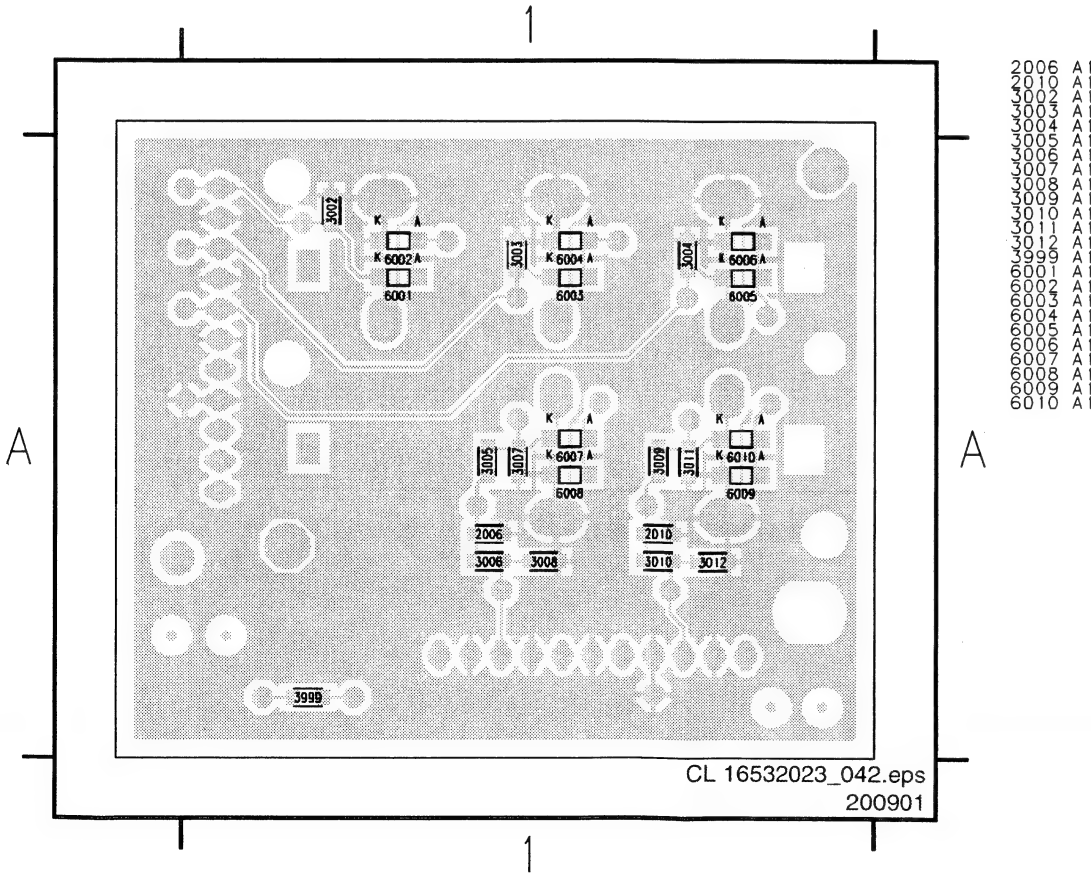
SD-Connector



Layout SD-Connector (Top Side)



Layout SD-Connector (Bottom Side)



Personal Notes:

Handwritten notes area with horizontal lines for writing.

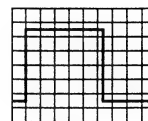
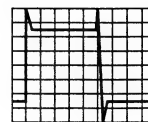
8. Electrical Alignments

Index of this chapter:

1. General Alignment Conditions
2. Hardware Alignments
3. Software Alignments
4. Option Settings

Notes:

- The Service Default Mode (SDM) and Service Alignment Mode (SAM) are described in chapter 5. Menu navigation is done with the CURSOR UP, DOWN, LEFT AND RIGHT keys of the remote control transmitter.
- Figures below can deviate slightly from the actual product, due to different set designs.



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8.1 General Alignment Conditions

Perform all electrical alignments under the following conditions:

- Power supply voltage: 230 V_{ac} ± 10%, 50 Hz ± 5%.
- Allow the set to warm up for approximately 20 minutes.
- Voltages and waveforms are measured in relation to tuner earth (with exception to the voltages on the primary side of the power supply).

Caution: never use heatsinks as ground.

- Test probe: Ri > 10 MOhm, Ci < 20 pF.

Before performing any alignments, set the receiver box to the following settings:

- Dynamic contrast: OFF (via the PICTURE menu).
- Active control: OFF (via the remote control. The ACTIVE CONTROL key is the key between the smart keys, and toggles Active Control ON and OFF).
- Smart Picture mode: ECO.

8.2 Hardware Alignments

8.2.1 40.4 MHz Neighbour-channel Sound Trap Alignment

1. Tune to a checker board test pattern (system PAL B/G with a carrier frequency of 475.25 MHz).
2. Connect an oscilloscope to pin 19 (CVBS out) of the SCART1 connection and trigger line frequent.
3. Align the coil L5103 (diagram K1) completely downwards (see figure "SSP topview").
4. Align the coil upwards until under- and overshoot arise at the black/white and white/black transitions in the video signal (see figure "Waveform sound trap alignment").
5. Align the coil downwards again, until above mentioned under- and overshoot just disappears.

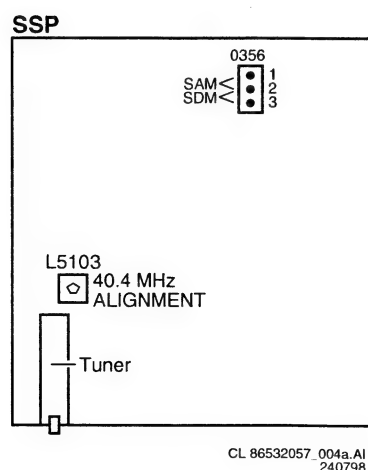


Figure 8-1 SSP top view

Figure 8-2 Waveform sound trap alignment

8.3 Software Alignments

Notes:

- Alignments are stored automatically
- Dealer option settings are stored automatically
- Service option settings must be stored with the STORE OPTIONS item in the top level SAM menu. It is **not** necessary to turn the receiver box OFF and back ON in order to store the values in NVM.

Put the set in SAM mode (see chapter 5). Now you can select the following alignments:

1. GENERAL:
 - LUMA GAIN
 - IF AFC
 - IF LPRIME AFC
 - TUNER AGC
 - BLEND INTENSITY
 - FBX TEST PATTERN
2. DRIVE:
 - TEST PATTERN
 - RED
 - GREEN
 - BLUE
 - RED BL OFFSET
 - GREEN BL OFFSET
3. LUM. DEL:
 - LUM. DELAY PAL BG
 - LUM. DELAY PAL I
 - LUM. DELAY SECAM
 - LUM. DELAY BYPASS

8.3.1 GENERAL Alignments

LUMA GAIN

This item has a fixed value of "3" (for EU/AP).

IF AFC

Connect the RF output of a video pattern generator to the antenna input.

From the generator, supply a PAL B/G TV signal with a signal strength of at least 1 mV and a frequency of 475.25 MHz.

Alignment procedure:

1. Go to the INSTALL menu.
2. Select MANUAL INSTALLATION.
3. Tune the TV-set to the system and frequency described above via SEARCH - 475.00 - OK.
4. If the frequency shown in the FINE TUNE line (after the SEARCH is completed) is between 475.18 MHz and 475.31 MHz, you do **not** need to realign the IF AFC.

5. If the frequency lies outside this range, adjust the frequency in the FINE TUNE line to 475.25 MHz and STORE the program (this is **very important** because this will disable the AFC algorithm).
6. Navigate to the SAM main menu and select ALIGNMENTS - GENERAL - IF AFC.
7. During the IF AFC parameter adjustment, there is OSD feedback at the top of the screen.
8. This OSD feedback will contain one of four messages:

Table 8-1 AFC Alignment feedback

AFC-window	AFC-frequency versus reference
Out	High
In	High
In	*Low*
Out	Low

The first item (IN or OUT) informs you whether you are in or out of the AFC window. The second item (HIGH or LOW) informs you whether the AFC frequency is too high or too low.

1. Adjust the IF AFC parameter until the first value is within the AFC window (= IN).
2. Next, adjust the IF AFC parameter until the second value is LOW.
3. After adjustment, STORE the value.
4. Return to the INSTALL menu.
5. Select MANUAL INSTALLATION - SEARCH - 475.00 - OK and STORE. This will turn the AFC algorithm ON again.

Service tip: If you do not trust the frequency accuracy of your service generator, connect it to a "good" TV set and check it with the FINE TUNE line.

IF LPRIMEAFC

Same procedure as described above but with other signal source (SECAM L').

TUNER AGC

Connect the RF output of a video pattern generator to the antenna input.

From the generator, supply an PAL B/G TV signal with a signal strength of approximately 2 mV and a frequency of 475.25 MHz.

Measure the DC voltage on pin 1 of the Tuner (item 1102). You can adjust this voltage by adjusting the TUNER AGC item in the SAM menu. Alignment is correct when the DC voltage is just below 3.8 V.

BLEND INTENSITY

This adjustment aligns the level of transparency of the menu display that is blended into the main display. Use this alignment when the main microprocessor or the HOP IC is replaced.

1. Set the BRIGHTNESS, CONTRAST, and COLOR values (in the PICTURE menu) at the midpoint.
2. Using a video pattern generator, apply a signal with a 100% white video pattern to the set.
3. Connect an oscilloscope to the "Red" output of the Receiver box (pin 1 of the MONITOR OUT sub-D connector) and measure the Red output level.
4. Align the BLEND INTENSITY parameter so that the blended signal is 65 % of the black/white amplitude. This ratio will be about 0.45 V (blended signal) to 0.7 V (full white signal).

FBX TEST PATTERN

When this pattern is switched on, the set will display a picture that slowly changes from black to white, and vice versa. Use this pattern to check the functionality of the circuitry behind the FBX and the FBX function itself.

You can also use this pattern as a picture generator for the Flat TV plasma monitor (for example, for checking cell defects, interpretation of the ADC/DAC converters, etc).

Important: Be sure to set this pattern to OFF again when it is no longer needed, since it will not be automatically disabled when SAM is exited.

8.3.2 DRIVE Alignments

TEST PATTERN

The TEST PATTERN is not really needed for the alignment of the Receiver box. It can be used in the TV configuration as a test pattern to align the white colour temperatures of the monitor. However, the monitor itself (as a stand alone unit) can also be aligned in other ways (described in the Service Manual of the TV monitor).

RGB Output Amplitude Adjustment

1. Load the RGB output (sub-D connector AV303) of the Receiver box with a TV monitor (or match RGB output lines with 75 ohm resistors, if no monitor is available), and measure the outputs with an oscilloscope.
2. Apply an artificial white CVBS signal (1 V_{pp} white-to-top-sync, with a 0.3 V sync amplitude) to the external 2 input.
3. Set LUMA GAIN to a value of "3" (via the SAM menu ALIGNMENTS - GENERAL).
4. Set RED, GREEN, and BLUE to "24" (via the SAM menu ALIGNMENTS - DRIVE).
5. Set RED BL OFFSET and GREEN BL OFFSET to "7".
6. Adjust the gain (with the RED, GREEN, and BLUE slider bars) until the oscilloscope-measured values for R, G, and B are 700 mV ± 10 mV with respect to the front porch of the signal.

8.3.3 LUM. DELAY Alignments

With this alignment, you place the luminance information directly on the chrominance information (brightness is pushed onto the colour). Input a colour bar or grey scale pattern as a test signal.

LUM. DELAY PAL BG

Set value to "12". If the luminance signal referred to the chrominance signal still has a time delay, adjust the value to solve this.

LUM. DELAY PAL I

Set value to "12". If the luminance signal referred to the chrominance signal still has a time delay, adjust the value to solve this.

LUM. DELAY SECAM

Set value to "11". If the luminance signal referred to the chrominance signal still has a time delay, adjust the value to solve this.

LUM. DELAY BYPASS

Set value to "10". If the luminance signal referred to the chrominance signal still has a time delay, adjust the value to solve this.

8.4 Option settings

8.4.1 Introduction

The microprocessor communicates with a large number of (I2C) ICs in the set. To ensure good communication and make digital diagnosis possible, the microprocessor has to know which ICs to address. The presence or absence of specific ICs or functions is made known by means of the option codes.

All options codes can be manipulated using both the Option Numbers and/or the Option menu.

All *hardware* related options are incorporated under the heading SERVICE OPTIONS in the SAM main menu.

All *software* related options are incorporated under the heading DEALER OPTIONS in the SAM main menu.

After you have changed the option(s), save them via the STORE OPTIONS command. The new option setting is only active after the TV is switched OFF and ON again via the mains switch (the EAROM is then read again).

8.4.2 Dealer Options

Select this sub-menu to set the initialisation codes (= options) of the set via text menu's.

Menu name	Subjects	Options	Physically in set
Personal Options	Picture Mute	Yes	Video mute active when there is no signal detected
		No	Noise when there is no signal detected
	Virgin Mode	Yes	TV starts up with language selection menu
		No	TV does not start up with language selection menu
	Auto Store Mode (for EU)	None	Auto Store mode disabled (not in installation menu)
		PDC-VPS	Auto Store mode via ATS (Automatic Tuning System) enabled
		TXT page	Auto Store mode via ACI (Automatic Channel Installation) enabled
		PDC-VPS-TXT	Auto Store mode via ATS or ACI enabled
	Txt Preference (for EU)	FLOF	Preference to FLOF (Full Level One Features) teletext
		TOP	Preference to TOP (Table Of Pages) teletext

Note: Above overview gives the menu items for all regions (EU/AP/US). The correct settings differs per region (see Option Numbers).

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Figure 8-3 Dealer options overview

8.4.3 Service Options

Select this sub-menu to set the initialisation codes (= options) of the set via text menu's.

Menu-item	Subjects	Options	Description
Chassis region	Region (for EU)	Europe	Setting for Europe
		AP	Setting for AP PAL-multi
Dual Screen	PIP/Dual Screen	Yes	Feature present
		No	Feature not present
	TXT/EPG Dual Screen (for EU)	Yes	Feature present
		No	Feature not present
Teletext	Flash RAM (for EU)	Yes	Flash RAM present
		No	Flash RAM not present
	NexTVView (for EU)	2	EPG level 2 setting
		2C3	EPG level 3 setting
Monitor type	Monitor	F19	Receiver-box can operate with 42i F19D-monitor, when jumper settings on AVI-panel are configured in 1.9-mode
		FM23	Receiver-box can operate with 32i FM23-monitor, when jumper settings on AVI-panel are configured in 2.3-mode
		FM24 (SL)	Receiver-box can operate with 42i FM24-monitor, when jumper settings on AVI-panel are configured in 2.3-mode (SL= Speaker Less)
		FM25-SL	Receiver-box can operate with 50i FM25-monitor, when jumper settings on AVI-panel are configured in 2.3-mode (SL= Speaker Less)
		FM26 (SL)	Receiver-box can operate with 42i FM26-monitor, when jumper settings on AVI-panel are configured in 2.3-mode (SL= Speaker Less)
Video repro	Featurebox type	Eagle	Eagle present (Pixel Plus)
		Falconic	Eagle not present (no Pixel Plus)
	Light sensor	Yes	Feature present
		No	Feature not present (for FTV1.9 and FM25-SL monitors only)
	2D Combfilter	Yes	Feature present
		No	Feature not present
	3D Combfilter	Yes	Feature present (for US only)
		No	Feature not present
	Picture improvement	Yes	LTP (TOPIC) present
		No	LTP (TOPIC) not present
	Auto scavem	Yes	Feature present
		No	Feature not present
Miscellaneous	Pixel Plus	Yes	Feature (Eagle) present
		No	Feature (Eagle) not present
	Signalling bits	Yes	For 16:9 sets
		No	For 4:3 sets
	Home Cinema (for EU)	Yes	Set with Home Cinema link
		No	Set without Home Cinema link
	Integrated Cinema (for EU)	Yes	Feature present
		No	Feature not present
	Stand Alone	Yes	Option needed for Service to be able to service the receiver-box with a normal PC monitor
		No	Default setting. In this setting, the receiver-box will go to Standby when connected to PC monitor
Opt. No.	Group 1		e.g. 04492 08449 49555 04112 (see sticker on bottom receiver-box)
	Group 2		e.g. 04151 00000 00000 00257 (see sticker on bottom receiver-box)

Note: Above overview gives the menu items for all regions (EU/AP/US). The correct settings differs per region (see Option Numbers).

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Figure 8-4 Service options overview

8.4.4 Option Numbers

Select this sub-menu to set all options at once (expressed in two long numbers).

An option number (or 'option byte') represents a number of different options. When you change these numbers directly, you can set all options very fast. All options are controlled via eight option numbers.

Example: The sticker on the bottom cover of an E-box gives the following option numbers:

04556 00257 49411 04112

04119 00001 00000 00271

The first line (group 1) indicates options 1 to 4, the second line (group 2) options 5 to 8 (see tables below).

Every 5-digit number represents 16 bits (so maximum number can be 65536 if all options are set).

When all the correct options are set, the sum of the decimal values of each Option Byte (OB) will give the option number.

OB	Bit	Option name	Settings (in decimal values) for F21RE_AB chassis		Option number
1	0	Featurebox	0= None	2= Prozonc	Sum OB1 (decimal)
	1			3= Eagle	
	2			4= Falconic (fixed)	
				5= Falconic 1050i 1250i	
	3	Comb Filter	0= Off	8= On (fixed)	
	4	Auto-Scavem	0= Off (fixed)	16= On (not appl. for FTV)	
	5	n.a. *	0		
	6	Light Sensor	0= Off (for FTV1.9 and FM25)	64= On (for the rest)	
	7	Luma Trans. Proc.	0= Off (for Eagle - PixelPlus - sets)	128= On (for non-Eagle sets)	
	8	PICNIC	0= Off	256= On (fixed)	
	9	n.a. *	0		
	10	n.a. *	0		
	11	LNA	0= Off (fixed)	2048= On (not appl. for FTV)	
	12	WSS	0= Off	4096= On (fixed)	
	13	3D Comb Filter	0= Off	8192= On (fixed)	
2	0	Headphone	0= Off	1= On (fixed)	Sum OB2 (decimal)
	1	Dolby ProLogic	0= Off (fixed)	2= On (not appl. for FTV)	
	2	Virtual Rear Spkrs	0= Off (fixed)	4= On (not appl. for FTV)	
	3	Cordless Rear Spkrs	0= Off (fixed)	8= On (not appl. for FTV)	
	4	Dolby Digital	0= Off (fixed)	16= On (not appl. for FTV)	
	5	DAS Cabinet	0= Off (fixed)	32= On (not appl. for FTV)	
	6	Subwoofer	0= Off (fixed)	64= Type 1 (not appl. for FTV)	
	7			128= Type 2 (not appl. for FTV)	
	8	P50 (for EU)	0= Off (fixed)	256= On	
	9	n.a. *	0		
	10	n.a. *	0		
	11	n.a. *	0		
	12	EPG Item (for EU)	0= Off (fixed)	4096= On	
	13	EPG Type (for EU)	0= Off (fixed)	8192= On	
	14	n.a. *	0		
3	0	AV3	0= Off	1= On (fixed)	Sum OB3 (decimal)
	1	AV4	0= Off	2= On (fixed)	
	2	AV4 (2fh)	0= Off (fixed)	4= On	
	3	n.a. *	0		
	4	Dual Screen	0= Off (fixed)	16= On	
	5	Scaler	0= Off (fixed)	32= On	
	6	EPG/TXT DS (for EU)	0= Off (fixed)	64= On (not for US)	
	7	Aux. Headphone	0= Off	128= On (fixed)	
	8	Aspect Ratio	0= 4:3 (not appl. for FTV)	256= 16:9 (fixed)	
	9	Tilt	0= Off (fixed)	512= On (not appl. for FTV)	
	10	DAF	0= Off (fixed)	1024= On (not appl. for FTV)	
	11	One Point Control	0= Off (fixed)	2048= On (not appl. for FTV)	
	12	Stand Alone	0= Off (with Philips plasma monitor)	4096= On (with standard PC-monit.)	
	13	200 Presets	0= Off (fixed)	8192= On (not appl. for FTV)	
	14	Home Cinema	0= Off	16384= On (fixed)	
4	0	MSP	0= MSP3415 (fixed)	1= MSP3451 (not appl. for FTV)	Sum OB4 (decimal)
	1			2= MSP3411 (not appl. for FTV)	
	2	China IF	0= Off (fixed)	4= On	
	3	Tuner	0= Philips (default)	8= Alps (optional)	
	4	Teletext	0= Off	16= On	
	5	China Teletext	0= Off (fixed)	32= On	
	6	Closed Caption	0= Off (fixed)	64= On (not for EU)	
	7	n.a. *	0		
	8	Digital Module (MILO)	0= Off (fixed)	256= On (not appl. for FTV)	
	9	n.a. *	0		
	10	n.a. *	0		
	11	n.a. *	0		
	12	Anti Aging mode	0= Off	4096= On	
	13	n.a. *	0		
	14	n.a. *	0		
	15	n.a. *	0		

*) Note: Bits that are not used have a fixed value of "0", and are mentioned as "n.a. *" in above overview.

Figure 8-5 Option bytes Group 1

OB	Bit	Option name	Settings (in decimal values) for F21RE_AB chassis		Option Number
5	0	Auto TV mode	0= Off	1= On	Sum OB5 (decimal)
	1	Auto Store Mode	0= None	2= PDC/VPS	
	2			4= TXT Page	
				6= PDC/VPS/TXT Page	
	3	n.a. *	0		
	4	Picture Mute	0= Off	16= On	
	5	Demo mode	0= Off	32= On	
	6	Virgin mode	0= Off	64= On	
	7	n.a. *	0		
	8	n.a. *	0		
	9	n.a. *	0		
	10	n.a. *	0		
	11	n.a. *	0		
	12	TXT Preference	0= TOP	4096= FLOF	
	13	n.a. *	0		
	14	n.a. *	0		
	15	n.a. *	0		
6	0	P50 DVD menu-line	0= Off	1= On	Sum OB6 (decimal)
	1	Asia	0= Off	2= On	
	2	n.a. *	0		
	3	n.a. *	0		
	4	n.a. *	0		
	5	n.a. *	0		
	6	n.a. *	0		
	7	n.a. *	0		
	8	n.a. *	0		
	9	n.a. *	0		
	10	n.a. *	0		
	11	n.a. *	0		
	12	n.a. *	0		
	13	n.a. *	0		
	14	n.a. *	0		
	15	n.a. *	0		
7	0	n.a. *	0		Sum OB7 (decimal)
	1	n.a. *	0		
	2	n.a. *	0		
	3	n.a. *	0		
	4	n.a. *	0		
	5	n.a. *	0		
	6	n.a. *	0		
	7	n.a. *	0		
	8	n.a. *	0		
	9	n.a. *	0		
	10	n.a. *	0		
	11	n.a. *	0		
	12	n.a. *	0		
	13	n.a. *	0		
	14	n.a. *	0		
	15	n.a. *	0		
8	0	Cabinet	0= (not appl. for FTV)	1 - 14= (not appl. for FTV) 15= Other (fixed)	Sum OB8 (decimal)
	1				
	2				
	3				
	4	SLDP	0= Off (fixed)	16= On (not appl. for FTV)	
	5	n.a. *	0		
	6	AVL	0= Off (fixed)	64= On	
	7	n.a. *	0		
	8	FTV Monitor (auto detect)	0= FTV1.9	256= FM23 (default)	
	9			512= FM24	
	10			768= FM24-SL	
	11			1024= FM25-SL	
	12			1280= FM26	
	13			1536= FM26-SL	
	14			1792= FM27	
	15			2048= FM27-SL 65280= Other	

*) Note: Bits that are not used have a fixed value of "0", and are mentioned as "n.a. *" in above overview.

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Figure 8-6 Option bytes Group 2

Note: If the EARM is replaced, all the options will require re-setting. To be certain that the factory settings are reproduced

exactly, you must set both option number lines. These numbers can be found on the bottom of the Receiver box.

9. Circuit Descriptions, List of Abbreviations, and IC Data Sheets

Index of this chapter:

1. Introduction
2. Power Supply Unit (PSU)
3. Audio Video Interface panel (AVI)
4. Small Signal Panel (SSP)
5. Front panel (FP)
6. Auto TV
7. Abbreviations
8. IC Data sheets

Note:

- Figures can deviate slightly from the actual product, due to different set designs.
- For a good understanding of the following circuit descriptions, please use the diagrams in chapter 6 and 7. Where necessary, you will find a separate drawing for clarification.

9.1 Introduction

This Receiver box (or E-box) is developed for the global market. The service chassis name is F21Rx (x stands for the region; e.g. E=Europe, U= USA). It is an economic version of the F22Rx chassis, with the following features:

- Feature Box 7 for better EMC behaviour and improved "Natural Motion", however without "Eagle" (Pixel Plus).
- Without "Double Window" panel.
- Improved Tuner/Splitter (less noise).
- Without "Down Scaler" panel.

It can drive both FTV1.9 and FM2x plasma screens.

9.2 Power Supply Unit (PSU, diagram PS)

9.2.1 PSU: Introduction

A 35W Power Supply is used in the Receiver box. It supports a range of input voltages (= global), and can be used for almost every E-box version. It delivers the voltages for the SSP, the DW, the FBX (+5VSTB, 5V2, 8V6, 7V7, -7V7 and 33V), and for the specific PWBs. The output of the power supply is connected to the AVI panel. This panel powers all the other PWBs.

The Mains voltage is applied to the input filter that feeds it to the standby supply. This supply is always operational and delivers the +5VSTBY voltage.

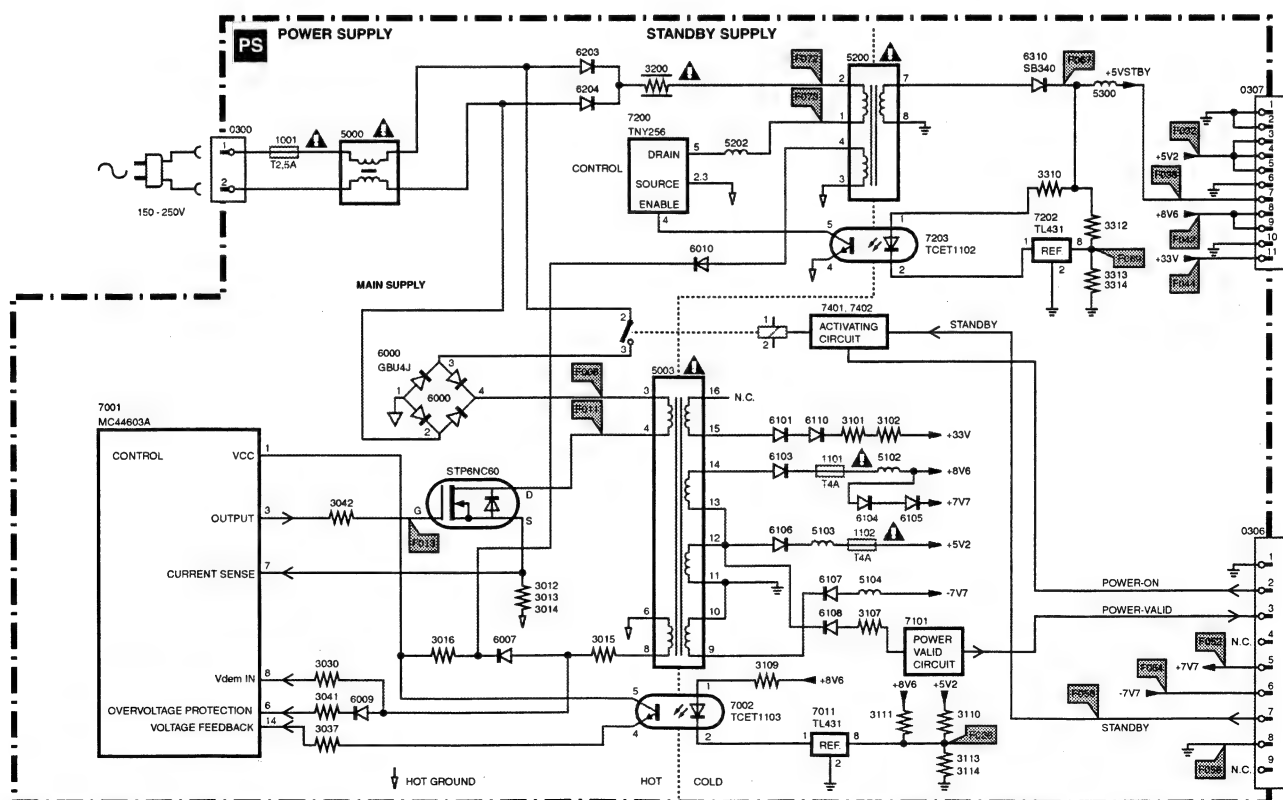
The task of the main supply is to deliver the supply voltages for the several electrical circuits in the Receiver box. It is switched via a single-pole relay, which is powered from the +5VSTBY voltage and controlled via the POWER_ON and STANDBY signals.

The reason to choose for a separate standby supply, instead of a single flyback supply (which can be driven in standby mode like a MC44604), is the requirement to have very low standby power consumption.

The "POWER ON/STBY" knob is located on the Front I/O panel and activates the relay supply (POWER_ON). The microprocessor is then able to switch the set from "standby" to "on" (STANDBY).

The green "POWER ON" LED is active, when the 8.6 V is present (HW controlled).

The red "STANDBY" LED is active in standby. The OTC controls this via ON_OFF_LED.



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Figure 9-1 Block Diagram Power Supply

The Power Supply module consists of three parts:

1. Mains voltage inlet and filter.
2. Standby supply.
3. Main supply.

The total power balance of the supply can be read from the following table:

Table 9-1 Total power balance

Supply	Value (V)	Tolerance (%)	Typ. Current (A)	P_max (W)
5V2	5.2	3	2.0	13
8V6	8.6	7	1.25	13.8
+7.7V_audio	8.6	7	0.1	1.2
-7.7V_audio	-5.2	7	0.1	1.2
33V_tuner	33		4 mA max.	0.1
5VSTB	5.32	5	0.3	2.7

9.2.2 PSU: Start-up Sequence

For a description of the "start-up sequence", we make a differentiation between the FTV1.9 and the FM2x monitors.

Start-up sequence for an E-box + FTV1.9 Monitor

There are five different "power states" in the E-box:

- **Low Power Standby (P < 0.9 W).** The Main supply is not working. Only the OTC and I/O Expanders (on the AVI-panel) are powered from the 5VSTB. The OTC works in one of the low power states (no program execution, but the UART, timer, RC pre-processor, and SW ADC are working).
- **Standby (P < 3 W).** The Main supply is not working. Only the OTC and I/O Expanders (on the AVI-panel) are powered from the 5VSTB. The OTC works in high power state (= normal).
- **Semi Standby (Europe only).** The Main supply is working. All PWBs are powered. The video in the HOP and the audio on the AVI board are muted. The sync is not send to the monitor. This state is used for EPG and P50 operations.
- **On (P < 35 W).** The Main supply is working. All PWBs are powered.
- **Off.** The OTC and I/O Expanders are not powered anymore. All the voltages are "off".

The E-box will always start-up in the "Standby" state until the CONFIG_IDENT is detected (means monitor attached). During initialisation, the E-box must check the "TV_standby" bit in the NVM, to decide into which state the E-box and monitor have to be put. This will set the STANDBY pin on the OTC accordingly. The initialisation starts when the E-box is switched "on" and the AC-power is connected. As a result, the 5VSTB supply is activated, and the OTC is activated. Now, the OTC checks the presence of the CONFIG_IDENT signal:

- If this check is successful (this means two following "hand shake" sequences are detected), then the state of the E-box depends on the "TV_standby" bit in the NVM. This bit contains the history data about how previously the TV configuration entered the "standby" state (e.g. when this was done by the user (bit= 1), the set will stay in "standby").
- If this check is not successful, the E-box will go to "Low Power Standby".

Note: For service, the E-box can work in "Stand-alone" power mode. This is detected via the "Stand alone" bit in the NVM. This bit can be set in the Dealer/Service menu.

If the E-box is switched from "Standby" to "On", the STANDBY pin of the OTC is pulled "low", the relay switch is closed, and the main supply is started up. When the 5V2 and 8V6 voltages reach their nominal values, the 5V2_PROT and 8V6_PROT are activated. Now:

1. The MSP shall be reset first, as this IC can disturb the I2C traffic, when not reset properly.
2. Secondly, as the POPOV IC of the DW (F2R22 only) can pull the slow SDA line "low" when the HA signal from the main HIP is not available, all traffic on the slow I2C bus needs to be delayed until the HIP is properly initialised and settled. This means a wait state of 100 ms, after the crystal configuration of the HIP has correctly been read out.
3. Next, all other ICs are initialised. Now, the E-box is working, but the monitor is still not displaying a picture.
4. The HOP switches on the PHI1 loop, the software sets all the necessary video and audio parameters, and enables them.

Start-up sequence for an E-box + FM2x Monitor

There are five different "power states" in the E-box:

- **Low Power Standby (P < 0.9 W).** The Main supply is not working. Only the OTC, I/O Expanders (on the AVI-panel) and remote circuits are powered from the 5VSTB. The OTC works in one of the low power states (no program execution, but the UART, timer, RC pre-processor, and SW ADC are working).
- **Peripheral Standby (P < 3 W).** This is an intermediate state. This mode is only used temporarily, if the OTC goes from low power standby to normal operation and vice versa.
- **Semi Standby (Europe only).** The Main supply is working. All PWBs are powered. The video in the HOP and the audio on the AVI board are muted. The sync is not send to the monitor. This state is used for EPG and P50 operations.
- **On (P < 35 W).** The Main supply is working. All PWBs are powered.
- **Off.** The OTC and I/O Expanders are not powered anymore. All the voltages are "off".

The E-box will always start-up in the "Standby" state until the AYT (Are You There) is detected. This means that an FM2x monitor is attached (this is different from the FTV1.9 monitor, where a separate CONFIG_IDENT line is used). During initialisation, the E-box must check the "Stand_alone" bit in the NVM. If this bit and the "TV_standby" bit both are not set, the AYT protocol is started, and will wake up the monitor. This will set the STANDBY pin on the OTC accordingly. The initialisation starts when the E-box is switched "on" and the AC-power is connected. As a result, the 5VSTB supply is activated, and the OTC is activated. Now, the OTC checks the presence of the "Standby" bit:

- If the "Standby" bit **and** the "Stand_alone" (or "Service/Factory") bit are **not** set, the AYT protocol is enabled, which will wake up the monitor. If this check is successful, the state of the E-box depends on the "TV_standby" bit in the NVM. This bit contains the history data about how previously the TV configuration entered the "standby" state (e.g. when this was done by the user (bit= 1), the set will stay in "standby").
- If this check is not successful (e.g. set to standby by user), the E-box will go to "Low Power Standby".

Note: For service, the E-box can work in "Stand-alone" power mode. This is detected via the "Stand alone" bit in the NVM. This bit can be set in the Dealer/Service menu. If this bit is "high", the AYT protocol is not used and no FSP commands are send to the monitor.

If the E-box is switched from "Low Power Standby" to "On", the STANDBY pin of the OTC is pulled "low", the relay switch is closed, and the main supply is started up. When the 5V2 and 8V6 voltages reach their nominal values, the 5V2_PROT and 8V6_PROT are activated. Now:

1. The MSP shall be reset first, as this IC can disturb the I2C traffic, when not reset properly.
2. Secondly, as the POPOV IC of the DW (F22Rx only) can pull the slow SDA line "low" when the HA signal from the main HIP is not available, all traffic on the slow I2C bus needs to be delayed until the HIP is properly initialised and

settled. This means a wait state of 100 ms, after the crystal configuration of the HIP has correctly been read out.

- Next, all other ICs are initialised. Now, the E-box is working, but the monitor is still not displaying a picture.
- The HOP switches on the PHI1 loop, the software sets all the necessary video and audio parameters, and enables them.

9.2.3 PSU: Mains Voltage Inlet and Filter

The Mains voltage is provided by inlet 0300, after which it is fused by a T2.5A fuse. The next part, the Mains voltage filter, consists of an LC-common mode filter section. This filter consists of two capacitors (items 2002 and 2004) from both phase and neutral to ground (to reduce the leakage current) and an inductor (5000). Interferences on one of the phases are shorted to ground by these capacitors.

Inductor 5000 also provides a differential-mode filtering with capacitor 2001. Resistor 3003 discharges this capacitor after the Mains voltage is disconnected.

At high voltage peaks (for example, lightning surges) on one of the phases, the resistance of VDR 3002 will be very low, causing fuse 1001 to interrupt. At a lightning surge on both phases with respect to chassis ground, the Mains voltage filter will form a high resistance, through which the voltage will rise very sharply. To prevent flashovers, a spark gap (item 1000) is implemented.

Resistors 3000 and 3001 are connected between neutral and chassis ground. They are required by safety regulations.

9.2.4 PSU: Standby supply

Start up

The Standby Supply operates on the AC voltage from the input filter part, and has to deliver a stable regulated 5 V value. The standby supply is always operational when the AC input voltage is present, even when the POWER switch is in the "off" position.

After a small bridge rectifier and buffer capacitor (D6203/6204 and C2202), the DC voltage is applied to a switched mode power supply. To reduce self-pollution, the rectifiers are bridged by small capacitors (C2200/2201).

Normal Operation

The Standby Supply itself is build around a "TINYSwitch" TNY256. This IC contains the control circuitry and a power MOSFET needed for an Switched Mode Power Supply (SPMS). It uses a simple "on/off" control loop to regulate the output voltage.

The supply for the TNY256 comes via safety resistor R3200, L5200, and L5202.

The +5VSTBY voltage at the secondary side is rectified by D6310 and smoothed by C2311.

By using secondary sensing, a very accurate +5VSTBY voltage and high efficiency is achieved. The sensing circuit uses a TL431 as reference voltage/error amplifier. Optocoupler 7203 and coil 5200 are used for the Mains voltage isolation. When the +5VSTBY output voltage rises, the reference voltage on the TL431 will exceed 2.5 V and the current through this device and the optocoupler LED will increase. By this method, the optocoupler transistor will conduct more. When this current (at pin 4 of IC7200) exceeds 50 μ A, the MOSFET is switched "off", and the output voltage will drop. When the current drops below 40 μ A, the MOSFET is switched "on" again.

Output Voltage

+5VSTBY, which is available on connector 0307, pin 7.

Protections

As the TNY256 is sensitive for transients, a "peak clamp" circuit (300 V zener diodes 6201 and 6202) is used to limit the voltage to a safe level.

9.2.5 PSU: Main supply

Introduction

The main supply is activated by single-pole relay 1400, which delivers the filtered Mains voltage to a rectifier bridge (item 6000). This rectified voltage is the input for the flyback converter, which generates the output voltages.

The flyback converter is based on a MC44603AP driven in "discontinuous conduction mode" with a fixed frequency of 40 kHz (at nominal Mains voltages). The MC44603AP drives a MOSFET (600 V, 1.2 Ohm), which is snubbed (by 2008) and clamped by an RCD peak clamp. The transformer delivers the secondary output voltages and the primary supply voltage for the IC.

Secondary voltage control is on the 5V2 and 8V6 output via a TL431 (item 7011) and an optocoupler (item 7002) back to the error amplifier input of the controller IC.

Output Voltages

The following voltages are generated by the main supply:

- +33V (0307/11) for the Tuner.
- +16V (0306/9).
- +8V6 (0307/8 & 9).
- +7V7 (0306/5).
- 7V7 (0306/6).
- +5V2 (0307/4 & 5).
- +5V2_FB (0307/3).

Start up

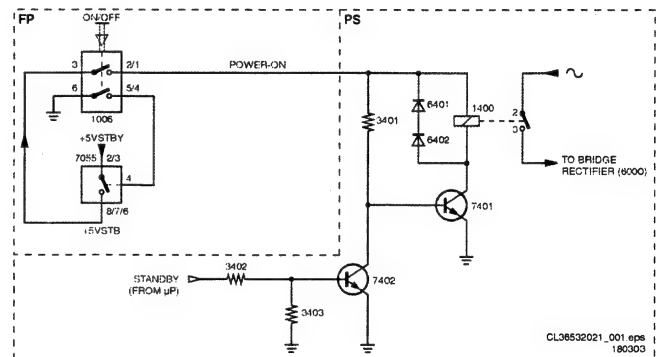


Figure 9-2 Start up circuitry

The mechanical "on/off" switch (item 1006) on the Front panel drives IC7055. This is a "power distribution switch", used due to the high switch-on current. It has internal overload and short-circuit protections.

A single pole 5 V relay (item 1400) will switch the Receiver box from "standby" to "on". It is controlled via the POWER_ON line.

The start up supply voltage of the control IC comes via the standby supply. It is rectified (D6010), smoothed (C2025), and clamped (D6008). Once the main supply is started, this voltage is taken over by winding 6-8 of transformer 5003 and diode D6007.

Normal operation

The working frequency of 40 kHz is determined by R3032 and C2014. The output voltage is controlled by duty cycle regulation. Output is on pin 3, which drives the FET. A current will flow through transformer coil 3-4 (item 5003), FET 7000, and sense-resistors R3012/R3013/R3014 to ground. The energy stored in the primary winding during the on time is delivered to the secondary windings during the "off" time. The output voltages are rectified and buffered here.

Regulation is performed by the control loop that consists of reference component 7011 and optocoupler 7002. When the +5V2 output voltage rises, the reference voltage on the TL431 will exceed 2.5 V and the current through this device and the optocoupler LED will increase. By this method, the optocoupler transistor will conduct more, and the voltage over R3035 (and pin 14 of IC7001) will rise. The IC will adjust the duty cycle, the FET will conduct less, and the output voltage will decrease.

Protections

Soft Start and Maximum Duty Cycle

The output voltage is 0 V at start up. This would force IC 7001 to start with a maximum duty cycle, causing a very high current through FET 7000. To prevent this, capacitor C2018 (at pin 11 of IC7001) ensures a soft start (voltage at pin 11 is low at start up, which gives a small duty cycle) and R3039 determines the maximum duty cycle.

Switch Off Peak Voltage

To protect the FET against high peak (drain-source) voltages at switch "off", a peak clamp circuit is added consisting of D6014, D6002, C2007, and R3010.

When the FET blocks, the diodes will lead the peak voltages away from the FET and will charge C2007.

When the FET conducts, this capacitor is discharged via R3010, the primary coil, and the FET itself.

Over Current and Fold Back

The current through the primary winding is measured by sense resistors R3012, R3013, and R3014. The resulting voltage is measured at pin 7 of IC7001. Once the voltage at this pin exceeds 1 V (so maximum current is set to 3 A), the duty cycle is regulated back.

If the output load keeps on increasing ($I > 3\text{ A}$), the system is unable to supply enough energy to maintain the output voltage in regulation. This is detected at pin 5 of IC7001 (via pin 8 of 5003, R3015, D6007 and R3037). Consequently, if this voltage drops below the fold back threshold voltage of 1 V, the IC will adapt the "current sense threshold". This will limit the current supply and by this, the output voltage. This will cause an avalanche effect, causing the supply to rapidly trim down.

Over Voltage

When the voltage on pin 6 of IC7001 will exceed 2.5 V, the control IC will stop oscillating (after 2 μs). The output voltages will drop, and the IC starts again. This can happen when the feedback loop is interrupted.

Demagnetisation

The internal demagnetisation block in IC7001 disables the output (pin 3) during the demagnetisation phase of transformer 5003. This is to prevent the FET from being switched "on". The info is taken from pin 8 of transformer 5003, and fed via R3015 and R3030 to pin 8 of IC7001. When the voltage on this pin drops below 65 mV, the demagnetisation phase is completed, and the FET can switch on.

Audio Plop

The POWER_VALID circuit is designed to detect the disappearance of the Mains voltage (at set switch "off" or at Mains voltage dips). This signal will then mute the audio outputs to prevent audio plops (see diagram AV8 position I7). The circuit compares the +5V2 output with the negative rectified 5V2 winding (which is in fact the transformed rectified Mains voltage). When this voltage disappears, transistor 7101 is activated and the POWER_VALID output will go "low" before the supply output voltages will drop. It will mute the audio outputs and stay "low" until the Mains voltage and the +5V2 output voltage returns.

Switch On/Off Behaviour

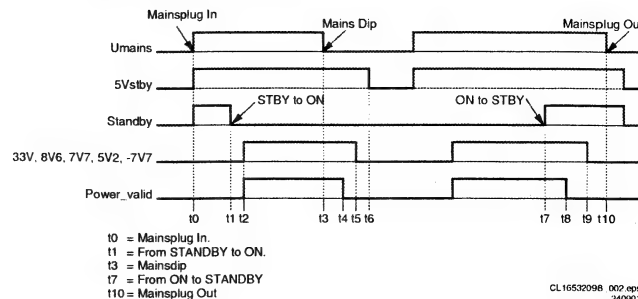


Figure 9-3 Timing diagram Power Supply

The start up of the PSU has to fulfil certain requirements. At the moment the Mains cord is connected (t0), the standby supply will generate the +5VSTBY (coming from the STANDBY pre-condition). With this voltage present, the microprocessor begins the start up procedure, by making the STANDBY command logic "low" (t1) and the POWER_ON command "high" (coming from the "off" pre-condition). After you press the power switch on the front panel, the "POWER_ON" signal will become "high" and within 2 seconds, the main supply will start, making the POWER_VALID signal "high" (t2).

When a Mains dip occurs (t3), the POWER_VALID signal must go "low" before the output voltages will drop and must remain "low" until the Mains voltage returns.

When you put the set in standby, the microprocessor makes the STANDBY signal "high" (t7). The output voltages will drop, and the POWER_VALID signal goes "low", but the +5VSTDBY remains present.

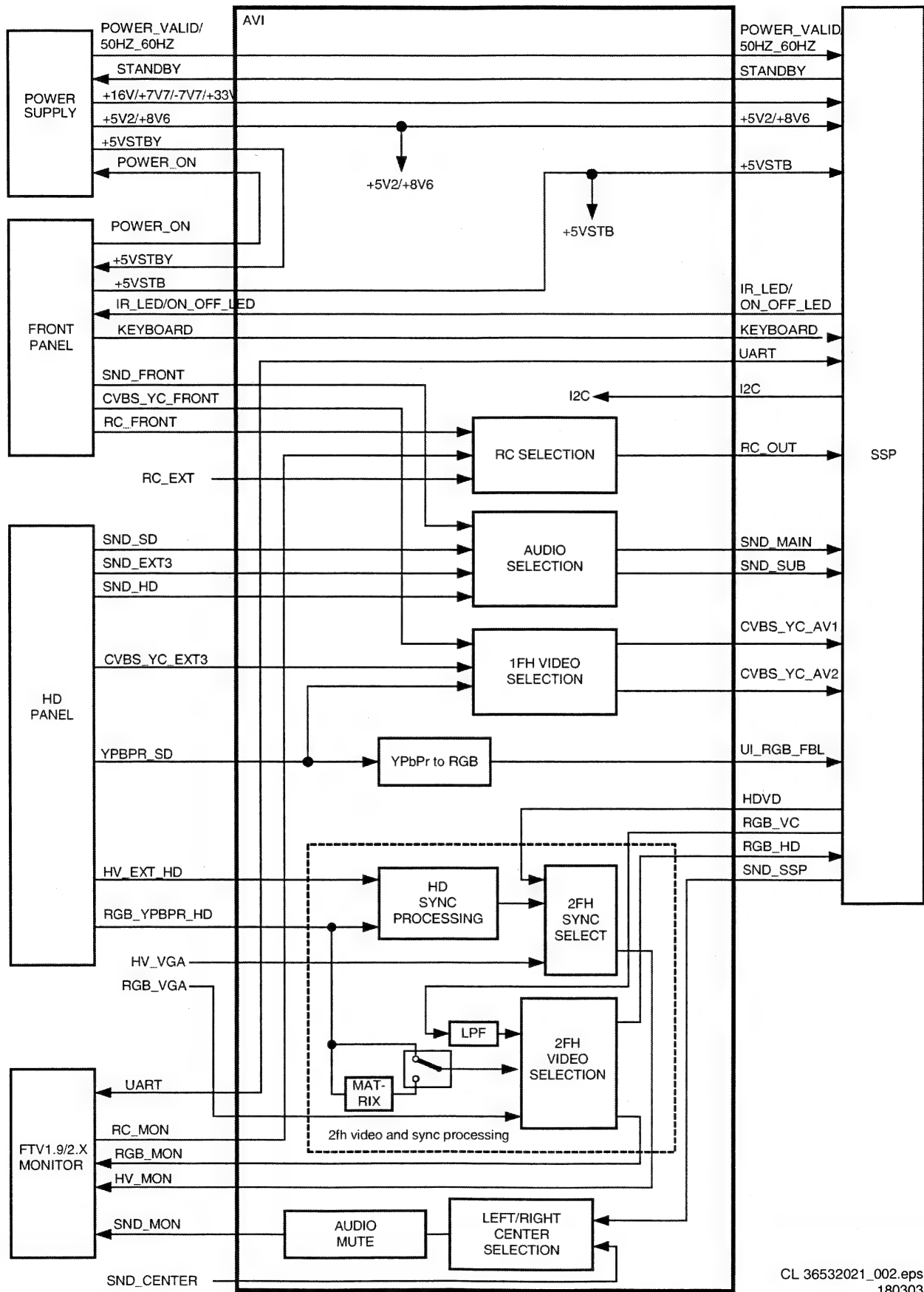
Finally, this voltage will drop when the Mains cord is disconnected (t10).

Typical timing values are:

- t1 - t2 = 0.1 < t < 1.2 s (dependent on the STANDBY PSU load).
- t3 - t4 = 20 < t < 350 ms (dependent on U_MAINS).
- t4 - t5 = 5 < t < 40 ms (dependent on the main PSU load).
- t5 - t6 = 10 < t < 1000 ms (dependent on U_MAINS and the STANDBY PSU load).
- t7 - t8 = 10 < t < 600 ms (dependent on U_MAINS and the MAIN PSU load).
- t8 - t9 = 5 < t < 40 ms (dependent on the MAIN PSU load).

9.3 Audio Video Interface Panel (AVI, diagram AV)

9.3.1 AVI: Introduction



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180303

Figure 9-4 Block diagram AVI panel

The AVI contains a video switch, an audio switch, an I/O expander, and an EPLD (or ACEX) with I2C control. The AVI panel is an interface between the following panels/sources:

- Small Signal panel (SSP).
- Front panel (FP).
- VGA input.
- Standard Definition panel (SD).
- Power Supply panel (PS).

It also contains the outputs to the plasma monitor.

9.3.2 AVI: Video Processing

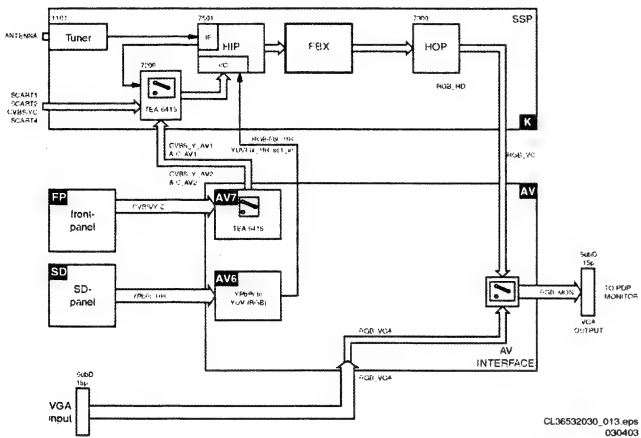


Figure 9-5 Block diagram video processing

1fH CVBS and YC Video Selection (diagram AV7)

For the video source selection, a TEA6415 (item 7710) from SGS-Thomson is used. The main function of this IC is to switch eight video input sources to six outputs. Each output can be switched to only one of the inputs, but any same input may be connected to several outputs. All the switching possibilities are controlled through the I2C bus.

At the input of the IC, we find the following signals:

- CVBS or Y/C from FRONT.
- CVBS or Y/C from EXT3.
- CVBS or Y/C from the Scaler (not used in this chassis).

At the output of the IC we find:

- CVBS_Y_AV1 and C_AV1.
- CVBS_Y_AV2 and C_AV2.

AV1 is connected to the CVBS/YC_FRONT input of the SSP (connector 0333).

AV2 is connected to the CVBS/YC_UI input of the SSP (connector 0372).

These signals go to the SSP via connectors 0333 and 0372, where they are fed to a second TEA6415 (item 7208), together with the video signals coming from the SCART connectors.

1fH Video processing (diagram AV6)

The YPbPr signals coming from the SD panel (EXT5) are buffered, and then fed through a YPbPr-to-RGB matrix circuit (TSH93, item 7607). The matrix is made with discrete hardware and determined by resistor values.

The RGB_SD output signals are then fed to connector 0372 and routed, via an RGB selector, to the RGB2 (Universal Interface) input of the HIP IC (item 7501) on the SSP.

9.3.3 AVI: Sync Processing

General

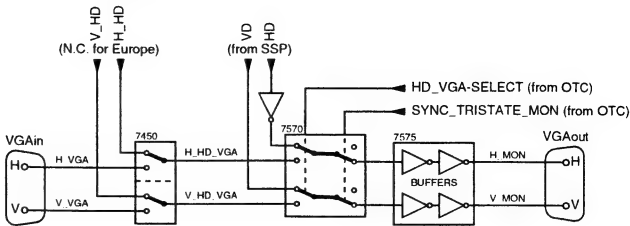


Figure 9-6 Block diagram sync processing

The block diagram above shows the sync path. The AV Interface has the following sync inputs:

- Sync from VGA source (HV_VGA)
- Sync from SSP (HD_VD)

The selection between these inputs for the main picture is done with switch 7570. This switch is controlled via software with the HD_VGA_SELECT signal.

Note: If the Receiver box has to function without the monitor (e.g. in case of EPG data download), the H and V pulses may not be fed to the monitor. In this case, switch 7570 will be put open with the SYNC_TRISATE_MON control signal (SW controlled).

9.3.4 AVI: Audio Processing

General

The audio-part of the AV-interface consists of three separate parts:

- The source selection.
- The Channel-channel configuration.
- Muting (or anti-plop circuit).

Source Selection

The source selection part redirects the three stereo inputs into two separate channels. These two channels (SNDL/R_MAIN_OUT and SNDL/R_SUB_OUT) are then connected to the SSP for further processing.

Note: The TEA6422 cannot handle the maximum level of 2.8 V of the SNDL/R_VGA signals. Therefore, these signals are attenuated by 3 dB (see R3801/3802 and R3806/3807 on diagram AV8). All other inputs are attenuated at the Front I/O panel or the HD connector panel. These attenuations are corrected again on the SSP.

Centre Channel Selection

The Centre input (cinch at the rear) is a separate audio input. This input bypasses all other inputs, and is designed to obtain a better *Home Cinema* configuration. In this case, the FTV monitor speakers will function as the centre channel. This input is selected via the CENTER_SELECT signal, which is controlled by the I/O Expander (items IC7880 and TS7853). It is selected by the user from the user menu.

Mute

To prevent audio plops and clicks (when the set is turned "on/off" or at channel switching), a mute circuit is implemented immediately after the centre channel selection part.

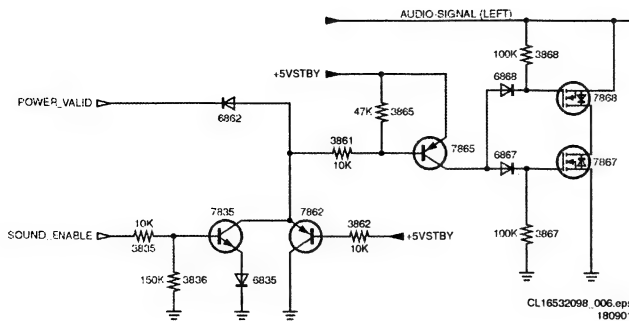


Figure 9-7 Audio mute circuitry

The table below shows how this is done. It is controlled by the following signals:

- POWER_VALID line is a control signal generated by the power supply.
- SOUND_ENABLE line is a control signal coming from the microprocessor on the SSP.
- +5VSTBY line, from the Front panel.

Table 9-2 Truth table audio mute

POWER_VALID (from PSU)	SOUND_ENABLE (from uP on SSP)	+5VSTBY (from Front Panel)	SIGNAL MUTED
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

When the SOUND_ENABLE signal is high, the two N-channel FETs are conducting the audio signal to the GND, and will mute the audio output.

Why are two FETs implemented? Because in a case of "no mute", and FET 7868 directly connected to ground, the diode in this FET would distort the audio signal too much. With the addition of FET 7867, this distortion is eliminated, because this FET is connected in anti-series.

The supply for the inverter is connected to the +5VSTBY. This supply signal is always available when the Mains is connected, so in case the Mains voltage is disconnected, the mute function is disabled.

9.4 Small Signal Panel (SSP, diagram K)

The SSP is based on the one used in the MG3.1 chassis. It consists of the following parts:

1. Control.
2. Video: Tuner and IF.
3. Video: HIP.
4. Video: Feature Box.
5. Video: HOP.
6. Audio

9.4.1 SSP: Control

The control part can be divided into:

- Set Control
- TXT/OSD
- Remote Control

Set Control

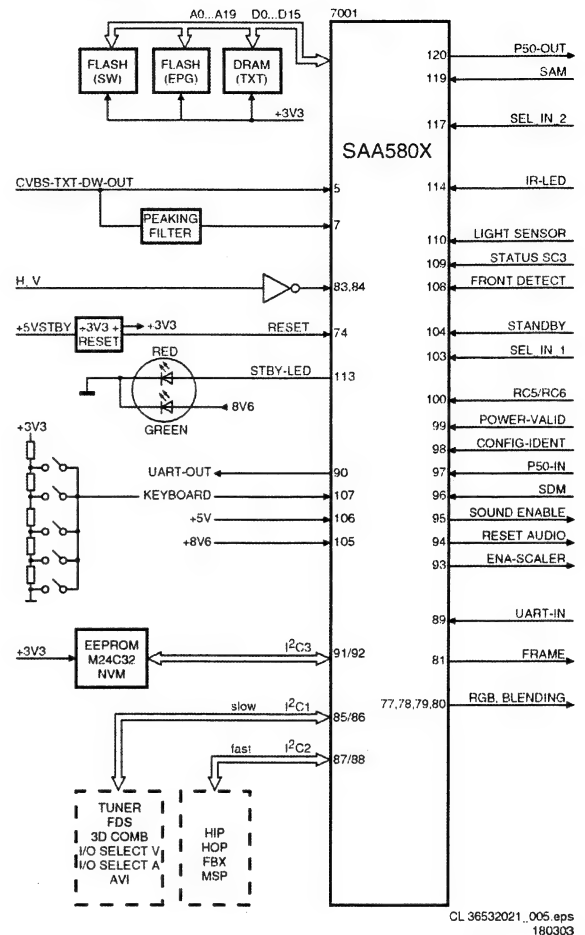


Figure 9-8 Block diagram Control part (uP)

The SAA5801 (IC7003) is called the OTC (OSD, TXT, and Control). In this IC, the microprocessor and the TXT-decoder (or Closed Caption for the USA) are integrated. The SAA5801 is also called the OTC2.5 because also TXT-level 2.5 is supported.

At start up, the RESET signal is generated with TS7006/7007. During a reset, all I/O pins are high. When a RESET is generated, the set is in Standby mode.

The 8V6 and the 5V2 are sensed by pins 105 and 106. If one of them is not present, the Power supply is switched "off". The OTC will generate an error code to indicate what was wrong. The horizontal (HOSD-PIP) and vertical (VD) pulses are also fed to the OTC for stable OSD and CC. To create good stable pulses, these signals are inverted and fed to the OTC. The RGB-outputs (77/78/79) together with fading (pin 80) are fed to the HOP. This fading pin has a double function:

- Make the menu transparent.
- Fast-blanking for CC.

There are three I2C busses used (see section "I2C overview"):

1. Slow I2C bus (max. 100 kHz) for tuner, DW, video-, and audio selection.
2. Fast I2C bus (max. 400 kHz) for the HIP, MSP, TOPIC, HOP, and FBX (PICNIC, and FALCONIC).
3. NVM I2C bus for the Non Volatile Memory to avoid data corruption.

- The OTC also has a connection with the Front panel:
- Driving the "on" and "STANDBY" LEDs.
 - Service tip:** The green LED gives a quick indication that the 8V6 voltage is present.
 - This chassis has an IR send-LED connected to pin 90 for communication with DST or ComPair.
 - The remote control signal comes in on pin 100.

Memory

The set software is in a 4 MB ROM (IC7002) and in a 32 KB ROM inside the OTC. The level at pin 73 of the OTC determines whether this internal software is used at start up. This level is determined with R3026/3029. The external ROM is driven via the OE and CS signals.

- The Non Volatile Memory (NVM) IC7008 is a 32 KB version M24C32W6, and is used to store
- Software identification.
 - Operational hours.
 - Error codes.
 - Option codes.
 - Presets.
 - Alignments.

All ICs in this part are supplied with 3V3. For this, a 3V3 stabilizer is used (IC7009).

Monitor communication (UART/FSP)

In total, four versions of the Receiver box are realised. There is an US and EU version (main difference is the HD part for US). Furthermore, there will be version for the current 42" FTV1.9 monitor and a version for the new FM2x monitor range. The difference between these versions is mainly the communication between the Receiver box and monitor. See table below:

Table 9-3 Overview UART diversity

Conn. 0303	F21R with FTV1.9	F21R with FM2x
Pin 4	Not used	RXDO
Pin 11	CONFIG_IDENT	TXDO
Pin 12	TXDO	Not used
Pin 15	RXDO	Not used

The Receiver box has to support both the FTV1.9 and the FM2x plasma monitors. The communication protocol for the FTV1.9 monitor is based on UART with a CONFIG_IDENT signal. However, all FM2x monitors have a new improved protocol called FSP (FTV System Protocol). Therefore, the pin layout on the FTV monitor output connector has been changed.

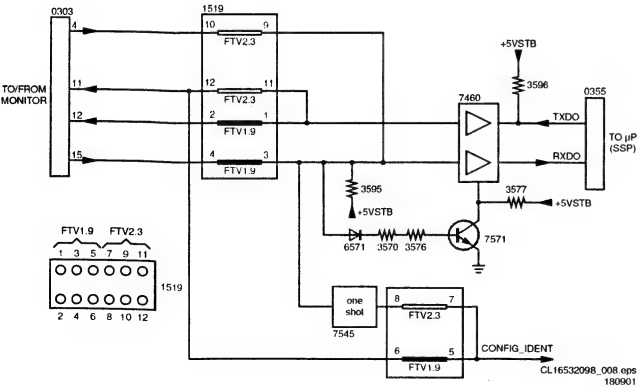


Figure 9-9 Block Diagram UART Circuitry

As the FM2x has no CONFIG_IDENT signal to "wake up" the Receiver box, a "dummy" CONFIG_IDENT is derived from the RXDO signal with the aid of a "one-shot generator" (item 7545). In order to prevent the RXD-line from connecting to ground, a protection circuit is added. This circuit puts the RXD-buffer into tri-state if the input is connected to ground for more than 100 ms. Because the diversity is realized with jumpers (connector 1519), there are no differences in panel stuffing for both versions.

Teletext/On Screen Display (TXT/OSD)

The TXT/OSD-decoder in the OTC gets its video signal directly on pin 5. The RGB-outputs are available on pins 77/78/79. Fast blanking is realized by pin 80. The RAM (IC7001) of the microprocessor is also used for the decoder.

Remote Control

The remote control uses RC6, because commands like "cursor control in eight directions" are used.

For this chassis, there are three possible RC input sources:

- RC_MON (coming from monitor),
- RC_BOX (coming from box), and
- RC_EXT (coming from an external source; this is not used).

The selection is performed as shown in the figure below:

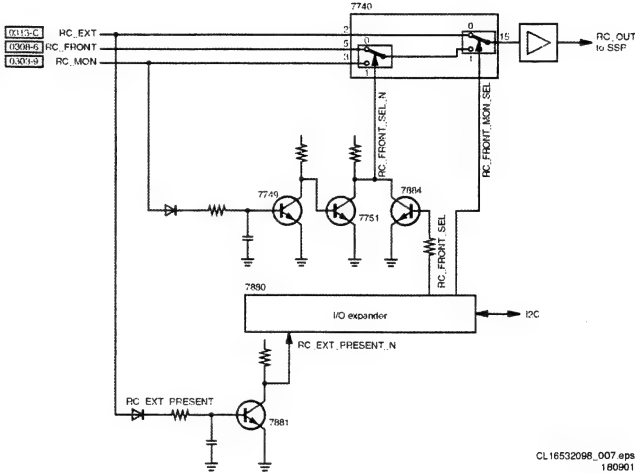


Figure 9-10 Block Diagram RC Selection Circuitry

When CONFIG_IDENT (for FTV1.9) or AYT (for FM2x) is detected, the RC_MON is selected. If there is no monitor connected, the RC_FRONT_SELECT signal is always "low", so RC_MON cannot be selected (via TS7749 and TS7751). After start up, when the I/O-expander is not yet set via I2C, the RC_FRONT signal is connected to RC_OUT.

9.4.2 SSP: Tuner and IF

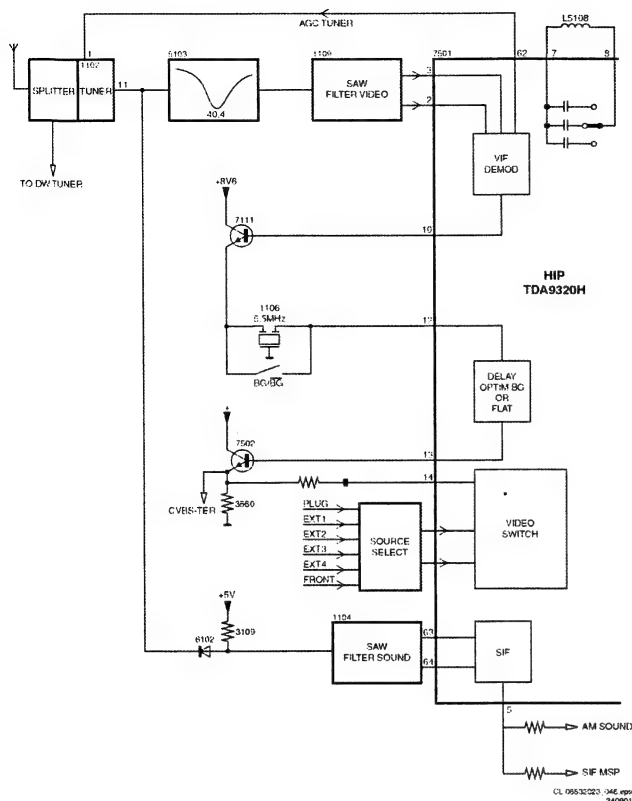


Figure 9-11 Overview Tuner and IF Part

Normally for chassis with the Double Window feature, a splitter is used. This splitter is on the chassis, beside the main tuner. From this splitter, the aerial signal is fed to the main tuner on the SSP and the DW tuner on the DW panel (which is not present in this chassis). Therefore, the aerial input is on the splitter.

The tuner part contains a tuner and an oscillator-mixer. The tuner is I2C controlled. The reference voltage at pin 9 is 33 V. This voltage (V_TUN) is derived from the secondary side of the standby supply. The OTC, together with the HIP, controls the tuning procedure.

The frequency of the local oscillator is compared with the frequency of a reference oscillator by a PLL. The varicap voltage is changed via I2C, and that changes the frequency of the reference oscillator.

For the higher frequencies, the tuning speed is increased by increasing the current that changes the varicap voltage.

The IF-part can be split into two important parts:

1. The IF-filter.
2. The IF-amplifier and demodulator.

The IF signal is fed to a SAW filter (item 1109 for the video and 1104 for the audio). The output of this filter is fed to the HIP for demodulation. The demodulator is PLL-controlled via a VCO. This VCO is I2C controlled (Service Alignment Mode IF-AFC alignment). Tuning of the VCO is possible by switching some small capacitors parallel to L5108. These capacitors are integrated in the HIP.

In addition, the AGC takeover point is I2C controlled (with the SAM menu).

Service tip: If the AFC is **not** adjusted **correctly**, very strange faults can occur: like spontaneous standby switching, cracking sound, incorrect CC, etc.

The demodulated video signal is available at pin 10, and then fed to a sound-trap. This is for filtering the rest sound carrier. Then the group delay time (system dependent) can be adapted, and at pin 13 of the HIP, the CBVS is available for further processing in the set.

The tuner-IF signal is also fed to a second SAW filter for the sound. At pin 5 of the HIP, the IF-sound is available. This signal is fed to the MSP for further processing (the IF-sound is demodulated by the MSP3410).

9.4.3 SSP: HIP (High-end Input Processor, diagram K1)

Introduction

The HIP (IC7501, TDA9320H) has the next functions:

- Source selection.
- Video IF-demodulation.
- Luminance, chrominance, and sync processing.

Inputs

The set has a total of five external inputs (AV1 - 5).

The HIP has an integrated source selector, which can handle:

- 3 CVBS inputs.
- 2 Y/C inputs.
- 2 RGB inputs.

The HIP detects whether the input is Y/C or CVBS and decides what to do. There are two inputs (pins 39 and 40) for detection of the RGB status. The other status voltages are checked by the OTC.

Video Processing

- The video identification block monitors whether a video signal is detected at one of the inputs. The Y/C switch detects whether the input is CVBS or Y/C, and switches these signals for luminance and chrominance processing. If a comb filter is used, the HIP detects they are "combed", and the YC switch will select the signals for the comb filter. The comb filter can be switched to the right system via the two system lines (SYS1 and SYS2) from the HIP.
- If the input signal is CVBS, then an internal colour trap is used in the Y path.
- The Y-delay can be controlled via the service menu to match the colour to the luminance (because of different signal paths there are different timings)
- Via the RGB-matrix, external RGB-signals are converted to YUV, for further 2fH conversion.
- The internal YUV switch switches between the demodulated video signal and an external RGB source.
- The sync processor in the HIP provides H_A and V_A sync signals for the Feature Box. This sync part is alignment free, but it should be noted that the line oscillator is locked with the colour oscillator.

Note: If the quartz crystal is defective, there will be no colour and synchronization problems. This crystal is very precise: if it is replaced by another type, there may be no colour, because of a different capacity. Therefore, you must use the genuine replacement part.

Outputs

The HIP has the following outputs:

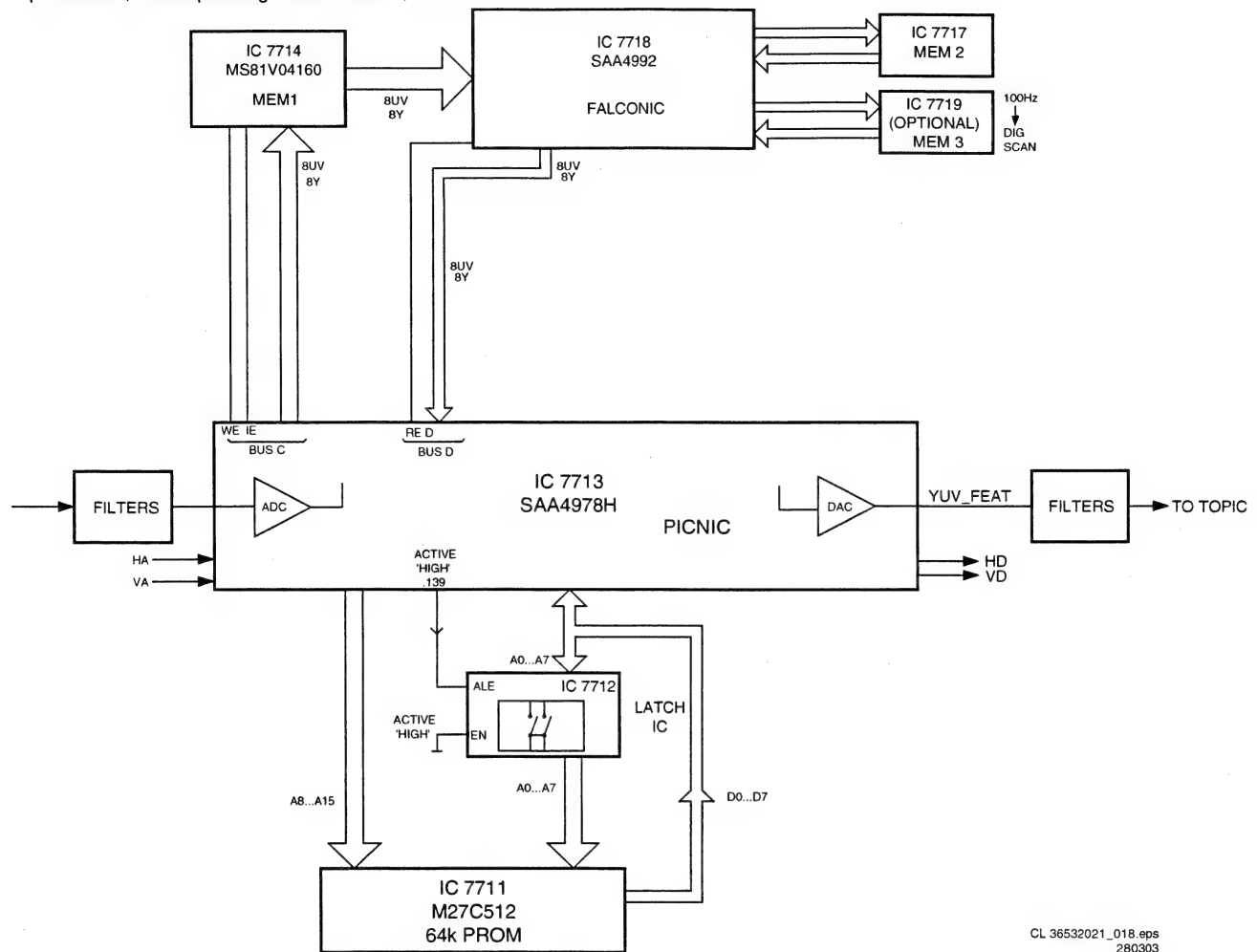
- YUV (50 Hz), for further picture processing on pins 49, 50 and 51.
- CVBS-DW, video signal for the Double Window module (if present) on pin 32.
- CVBS-SC2-OUT, monitor output (WYSIWYR = What You See Is What You Record).
- CVBS-TXT-OUT, CVBS for TXT and Comb filter.
- CVBS-TER, video signal from the tuner is fed to the I/O switching and to EXT1 on pin 19 of SCART.

9.4.4 SSP: Feature Box (FBX, diagram L)

conversion methods are possible. The PICNIC (SAA4978H) is the central key component.

Introduction

The basic function of the Feature Box (FBX) is picture improvement, and depending on the version, several scan

Block diagram

CL 36532021_018.eps
280303

Figure 9-12 Block Diagram FBX7

The 50 Hz YUV signals, coming from the HIP, are fed to the PICNIC via an anti-aliasing filter.

The (AABB) "frame frequency doubling" is done by the PICNIC (SAA4978, 160 pins QFP) together with a field memory (MEM1). The PICNIC can handle most 100 Hz functions (except Progressive Scan).

Via bus "C", a digitalized signal is presented to MEM1 (Field Memory 1), which is used for the 50 to 100 Hz conversions. The signal goes further via the data-bus to the FALCONIC. This IC has the following functions:

- Line flicker reduction.
- Digital Noise Reduction (DNR).
- Progressive scan.

It has an internal CPU and a (small) integrated ROM. The actual FBX7 software is located in an external ROM (item 7711). In order to limit the number of connections between the PICNIC and the external ROM, a number of lines are used twice. The lines A8 to A15 are fixed lines, while the lines A0 to A7 are made switchable with the eight data lines of the ROM. This is done via a Latch (item 7712), which is controlled by pin 139 of the PICNIC (the ALE signal).

At the end, the digital YUV (YUV_FEAT) signals from the PICNIC (pins 12, 14, and 15) enter the TOPIC.

This IC has the following functions:

- Luminance Transient Improvement (LTI).
- Peaking.
- Colour transients (CTI) and colour enhancement (TOPIC).

The digital YUV-signals from the PICNIC go, via a passive output filter, to the TOPIC and then to the HOP.

PICNIC (Diagram L1)

The PICNIC has the following functions:

- ADC/DAC.
- Interlaced to progressive scan conversion.
- Dual screen compression
- The Panorama mode.
- Automatic Aspect Ratio Adaptation (AARA)
- Colour Transient Improvement (CTI)
- The contrast improvement (Dynamic Contrast).

All these functions are integrated in one IC: the SAA4978H, 160 pins QFP.

ADC/DAC

- Analogue to Digital conversion is done with three identical 9-bit ADCs.
- Digital to Analogue conversion uses three identical 10-bit DACs.

In the PICNIC, there are three nine-bit ADCs present for Y, U, and V. For digitising the Y (luminance), nine bits are used (to realize a more detailed picture). These nine bits are only internally used. Via dithering, the nine bits are reduced to eight bits and this data is stored into memory. The data in the memory is fed back to the PICNIC and via un-dithering the data is again reproduced to nine bits for processing.

Via the reset circuit (TS7600/TS7601) a pulse of 20 ms is generated for the μP (in the PICNIC) and for the ROM. After power "on", the 3V3 is built up, which is derived from the 5V2. As long as the 5V2 is below the 3V3, the 3V3 follows the 5V2.

TS7600 blocks and so does TS7601. The voltage on pin 6 of IC7611 increases in the same way as the 3V3.

If the 5V2 rises above 3V3, the 3V3 stabilizes and TS7600 starts to conduct. Capacitors C2656//C2690 are charged by R3604 and R3605. At a voltage of 0.6 V, TS7601 will conduct and the voltage at pin 6 of IC7611 becomes low again. The (P is reset now.

If the PICNIC cannot communicate with the ROM, a reset is generated by the watchdog. Pin 7 of the PICNIC generates a pulse to create a new reset pulse for pin 6.

If one of the two supply voltages (3V3A, 3V3B) is absent, a safety problem could occur. The 3V3A is the supply voltage for the PICNIC and the 3V3B for the FALCONIC. If the 3V3 is too low, the base of TS7601 will be low via TS7612 and TS7613. If the base of TS7601 is made low, a RESET signal is generated for the PICNIC.

9.4.5 SSP: TOPIC and HOP (Diagram K6)

Introduction

The TOPIC (The most Outstanding Picture improvement IC, item 7402, type TDA9178), is an (optional) IC between the PICNIC and the HOP. It has the following (picture improvement) functions:

- Luminance Transient Processor (LTP), for detail enhancement.
- Chrominance delay circuitry, to compensate timing differences between Y and C.
- Spectral processor , for improved sharpness and colour transient improvement (CTI).
- Colour vector processor, for skin tone correction, green enhancement and blue stretch.
- Measure and detection circuitry, for AutoTV.

The sandcastle pulse from the HOP (High end Output Processor), is fed to pin 1 of the TOPIC, which is used as reference for timing.

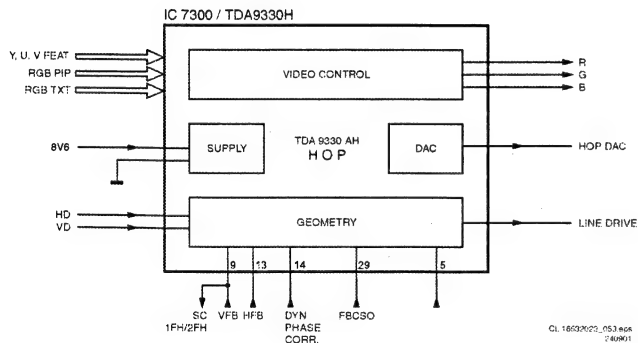


Figure 9-15 Block diagram HOP

The video processor and digital deflection processor are integrated in the HOP (IC7300, TDA9330H). Its main functions are:

- RGB interface for OSD/CC.
- Control of saturation, contrast, and brightness.
- Black/blue stretch.

Operation

After input selection, the YUV input is converted to RGB outputs. The RGB and fast blanking from the OTC (OSD and CC) are inserted on pins 35 - 38.

Blue stretch, measures the amplitude of the three RGB signals. If one of these colour signals reaches more than 80% of the nominal value, the amplification of Red and Green decreases. This is to achieve a higher colour temperature.

The RGB outputs are available at pins 40 - 42. They are buffered and fed to connector 0340, which goes to the AV-interface.

9.4.6 SSP: Audio processing

Introduction

The sound processing is distributed between the Flat Monitor (amplifier) and the Receiver Box (processing). The sound processing in the Receiver Box is completely done by the: MSP 3410D: demodulation for Europe and AP (including NICAM), or MSP 3440G: demodulation for US/LatAm/Taiwan (this IC also covers Korean stereo).

The MSP ICs contain audio processing, used for the basic L/R stereo sound. This processing involves bass, treble (via the equalizer), and balance (trim speakers). The volume is set to a fixed value, because the volume control is done in the monitor (via UART).

With the user interface, audio selection can be "mono", "stereo", or "surround" mode (surround mode will give spatial functionality). Stereo and spatial is only possible if a stereo signal is available.

All the extra audio sources, compared with the SSP, can be used in the main channel. The "Centre" input is available on the AV-interface panel. With this input, it is possible to use the monitor left and right speakers as a centre speaker in a home cinema configuration. This input can be selected via the User Interface.

For VGA it is not possible to select the "Centre" input, because the E-box OSD is not working for VGA inputs.

The selection of the possible inputs is divided over two separate panels: the SSP and the AVI panel. The input configuration dependsents on the E-box version (in combination with a TEA6422 (item 7777), the MSP is also used for a part of the source selection in the E-box).

Table 9-4 Audio I/O overview

Audio inputs and outputs (EU/AP)	Location
RF input	SSP
EXT1= SCART1 L/R-in and L/R-out	SSP
EXT2= SCART2 L/R-in and L/R-out	SSP
EXT3= SCART3 L/R-in	SSP
EXT4= SCART4 L/R-in	SSP
SD L/R (YPbPr-1fH)	SD panel
VGA L/R-in	AVI panel
Center audio in	AVI panel
Front L/R-in	Front panel
VGA audio out for FTV monitor L/R-out	AVI panel
CL-out for a Dolby audio receiver	SSP
Headphone out L/R	Front panel

9.5 Front Panel (FP, diagram FP)

9.5.1 General

This panel serves as an interface with the "outside world", and has the following inputs/controls/indicators:

- Power switch.
- Power LED.
- Audio L/R in.
- Video CVBS in.
- Video SVHS in.
- Headphone out.
- IR send-LED and receiver-LED (for Service).
- IR receiver (for Remote Control).
- Control buttons for MENU, PROGRAM, and VOLUME.

9.5.2 Audio path

Front audio inputs (SNDL/R_FRONT) are connected to the TEA6422 (item 7810) on the AV-Interface.
The headphone output signal (DS_AUDIO_L/R) from the DW module is routed to the front panel.

9.6 Auto TV

The Auto Picture Control (or AutoTV) aims at giving the customer the best possible picture performance at any time. Therefore, it does a real time processing of the video signal and, as a result, it decides to adapt several video parameters throughout the whole chassis. The user can choose the total effect of the Auto Picture Control on the screen via the remote control.

AutoTV consists of a set of algorithms that perform the following tasks:

- Auto Noise Reduction:
 - Input: noise measurement done in PICNIC.
 - Output: noise reduction of PICNIC, coring of PICNIC, TOPIC (if present), or EAGLE (if present).
- Auto Sharpness:
 - Input: steepness information and band energy in PICNIC.
 - Output: sharpness settings in PICNIC, TOPIC (if present), or EAGLE module (if present).
- Auto Ambient Light (in combination with histogram):
 - Input: light sensor information (from TV monitor).
 - Output: is depending on the user setting of Active Control. If "maximum", saturation and contrast of the HOP and histogram settings in PICNIC. If "medium", only HOP saturation and PICNIC histogram.
- Auto colour:
 - Input: user smart mode choice.
 - Output: colour features of the EAGLE (or TOPIC), like green enhancement and skin tone correction.

The FTV E-Box has no own light sensor, instead they is featured in the TV monitors. The E-box is involved in the image control loop for these light sensors. The 42" F19D and 50" FM25 monitor do not have a light sensor.

The user can select four different settings: OFF, MIN, MED and MAX. The setting does not change the amount of the influence of the algorithms on the screen, but partly switches algorithms ON (see table below).

Table 9-5 Active Control settings

Active Control	OFF	MIN	MED	MAX	ON (**)
Auto Ambient	off	off	on (*)	on	off
Auto Color	(***)	(***)	(***)	(***)	(***)
Auto Histogram	on	on	on	on	on
Auto Sharpness	on	on	on	on	on
Auto Noise	off	on	on	on	on

(*) In MEDIUM, the monitor contrast coupling of ambient is not working.

(**) When the light sensor is not present, ambient light control is not possible and the setting of the AutoTV button is limited to OFF/ON.

(***) Independent of Active Control is OFF/MIN/MED/MAX. Dependent of colour enhancement setting (in picture menu) and smart picture mode.

9.7 Abbreviation list

ADC	Analogue to Digital Converter
AM	Amplitude Modulation
AP	Asia Pacific
ATSC	Advance Television Systems Committee
AV	External Audio/Video
AVI	Audio and Video Interface
B/G	Monochrome TV system. Sound carrier distance is 5.5 MHz
BTSC	Broadcast Television Standard Committee. Multiplex FM stereo sound system, originating from the USA and used in LATAM and AP-NTSC countries
CBA	Circuit Board Assembly (Printed Circuit Board)
ComPair	Computer aided rePair
CSYNC	Composite SYNC
CVBS	Composite Video Blanking and Synchronization
DAC	Digital to Analogue Converter
D/K	Monochrome TV system. Sound carrier distance is 6.5 MHz
DFU	Directions For Use: owner's manual
DNR	Dynamic Noise Reduction
DRAM	Dynamic RAM
DSP	Digital Signal Processing
DTS	Digital Theatre Sound
DVD	Digital Video Disc
DW	Double Window
E-box	Electronic box (Receiver box)
EEPROM	Electrically Erasable and Programmable Read Only Memory
EU	EUrope
EXT	EXTernal (source); entering the set by SCART or cinch (jack)
FALCONIC	Field And Line CONverter IC
FBX	Feature BoX
FLASH	FLASH memory
FM	Field Memory or Frequency Modulation
FSP	FTV System Protocol
FTV	Flat TV (plasma screen)
HD	High Definition
HFB	Horizontal FlyBack
HP	HeadPhone
I	Monochrome TV system. Sound carrier distance is 6.0 MHz
I2C	Integrated IC bus
I2S	Integrated IC Sound bus
IF	Intermediate Frequency
Interlaced	Scan mode where two fields are used to form one frame. Each field contains half the number of the total amount of lines. The fields are written in "pairs", causing line flicker.
IR	Infra Red
IRQ	Interrupt ReQuest
LATAM	LATin America
LED	Light Emitting Diode
L/L'	Monochrome TV system. Sound carrier distance is 6.5 MHz. L' is Band I, L is all bands except for Band I
LS	LoudSpeaker
M/N	Monochrome TV system. Sound carrier distance is 4.5 MHz
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
MPEG	Motion Pictures Experts Group
NC	Not Connected

NICAM	Near Instantaneous Compounded Audio Multiplexing. This is a digital sound system, used mainly in Europe.	YPbPr	Component video (Y= Luminance, Pb/Pr= Colour difference signals)
NTSC	National Television Standard Committee. Colour system used mainly in North America and Japan. Colour carrier NTSC M/N = 3.579545 MHz, NTSC 4.43 = 4.433619 MHz (this is a VCR norm, it is not transmitted off-air)	Y/C	Luminance (Y) and Chrominance (C) signal
NVM	Non-Volatile Memory: IC containing TV related data (for example, options)	YUV	Component video
OC	Open Circuit	0/6/12	SCART switch control signal on A/V board. 0 = loop through (AUX to TV), 6 = play 16:9 format, 12 = play 4:3 format
OSD	On Screen Display	480i	480 visible lines, interlaced
P50	Project 50 or Easy Link	480p	480 visible lines, progressive scan
PAL	Phase Alternating Line. Colour system used mainly in Western Europe (colour carrier = 4.433619 MHz) and South America (colour carrier PAL M = 3.575612 MHz and PAL N = 3.582056 MHz)	1080i	1080 visible lines, interlaced
PCB	Printed Circuit Board	1080p	1080 visible lines, progressive scan
PCM	Pulse Code Modulation		
PICNIC	Picture Improvement Combined Network IC		
PIP	Picture In Picture		
PLL	Phase Locked Loop. Used, for example, in FST tuning systems. The customer can directly provide the desired frequency		
Progressive Scan	Scan mode where all scan lines are displayed in one frame at the same time, creating a double vertical resolution.		
RAM	Random Access Memory		
RC	Remote Control transmitter		
RC5	Remote Control system 5, the signal from the remote control receiver		
RGB	Red, Green, and Blue		
RGBHV	Red, Green, Blue, Horizontal sync, and Vertical sync		
ROM	Read Only Memory		
RXD	Receive Data (UART)		
SCART	Syndicat des Constructeurs d'Appareils Radiorecepteurs et Televisieurs		
SCAVIO	Scaler Control Audio Video Input and Output		
SCL	Serial CLock I2C		
SD	Standard Definition		
SDA	Serial DATA I2C		
SDRAM	Synchronous DRAM		
SECAM	SEquence Couleur Avec Memoire. Colour system used mainly in France and Eastern Europe. Colour carriers = 4.406250 MHz and 4.250000 MHz		
SMPS	Switch Mode Power Supply		
SND	SouND		
S/PDIF	Sony Philips Digital InterFace		
SRAM	Static RAM		
SSP	Small Signal Panel		
STBY	STandBY		
SVHS	Super Video Home System		
SW	SoftWare		
THD	Total Harmonic Distortion		
TOPIC	The most Outstanding Picture improvement IC		
TXD	Transmit Data (UART)		
TXT	TeleteXT		
UART	Universal Asynchronous Receiver Transmitter		
uP	Microprocessor		
VCR	Video Cassette Recorder		
VGA	Video Graphics Array		

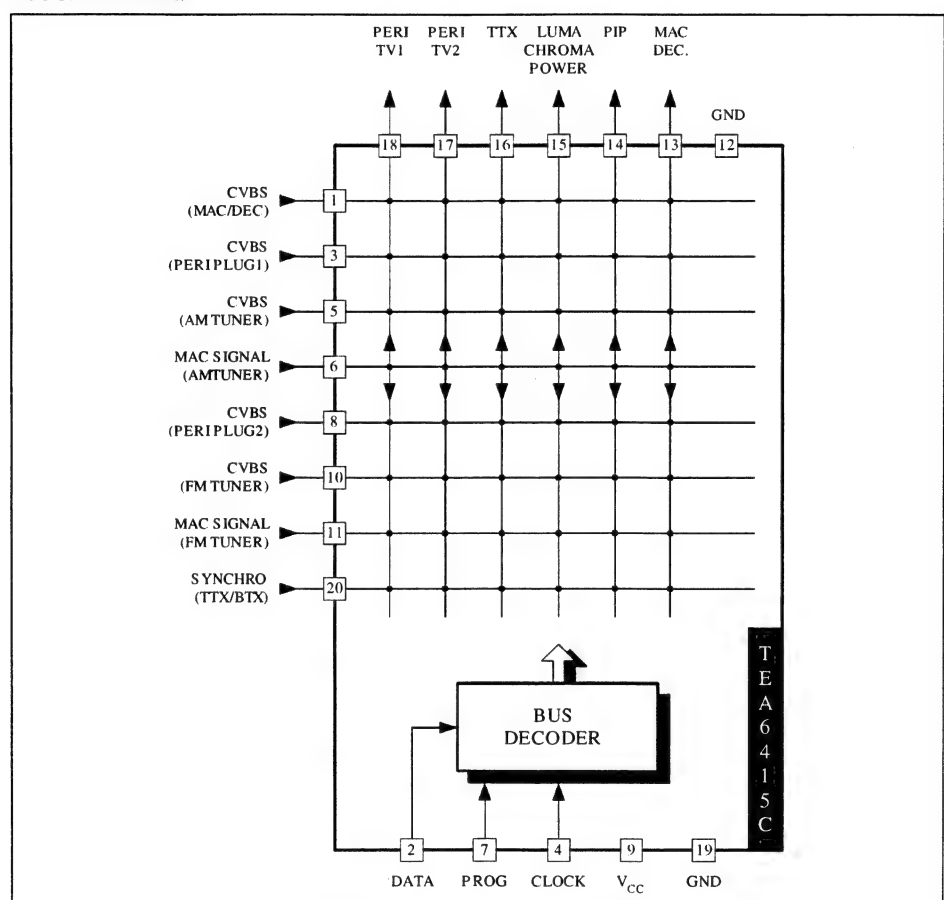
9.8 IC Data Sheets

In this section, the internal block diagrams and pin layouts of ICs that are drawn as "black boxes" in the electrical diagrams (with the exception of the "memory" and "logic" ICs) are given.

9.8.1 Diagram AV7, TEA6415 (IC7710)

TEA6415C

BLOCK DIAGRAM



GENERAL DESCRIPTION

The main function of the IC is to switch 8 video input sources on 6 outputs.

Each output can be switched on only one of each input. On each input an alignment of the lowest level of the signal is made (bottom of synch. top for CVBS or black level for RGB signals).

Each nominal gain between any input and output is 6.5dB. For D2MAC or Chroma signal the alignment is switched off by forcing, with an external resistor bridge, 5 V_{DC} on the input. Each input can be used as a normal input or as a MAC or Chroma

input (with external resistor bridge). All the switching possibilities are changed through the BUS.

Driving 75Ω load needs an external transistor.

It is possible to have the same input connected to several outputs.

The starting configuration upon power on (power supply : 0 to 10V) is undetermined.

In this case, 6 words of 16 bits are necessary to determine one configuration. In other case, 1 word of 16 bits is necessary to determine one configuration.

Figure 9-16 TEA6415 Internal Block Diagram (Switch)

**TEA6415C****BUS-CONTROLLED VIDEO MATRIX SWITCH**

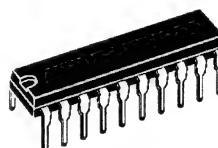
- 20MHz BANDWIDTH
- CASCADABLE WITH ANOTHER TEA6415C (INTERNAL ADDRESS CAN BE CHANGED BY PIN 7 VOLTAGE)
- 8 INPUTS (CVBS, RGB, MAC, CHROMA, ...)
- 6 OUTPUTS
- POSSIBILITY OF MAC OR CHROMA SIGNAL FOR EACH INPUT BY SWITCHING-OFF THE CLAMP WITH AN EXTERNAL RESISTOR BRIDGE
- BUS CONTROLLED
- 6.5dB GAIN BETWEEN ANY INPUT AND OUTPUT
- -55dB CROSSTALK AT 5MHz
- FULLY ESD PROTECTED

DESCRIPTION

The main function of the TEA6415C is to switch 8 video input sources on the 6 outputs.

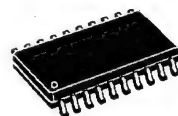
Each output can be switched to only one of the inputs whereas but any same input may be connected to several outputs.

All the switching possibilities are controlled through the I²C bus.



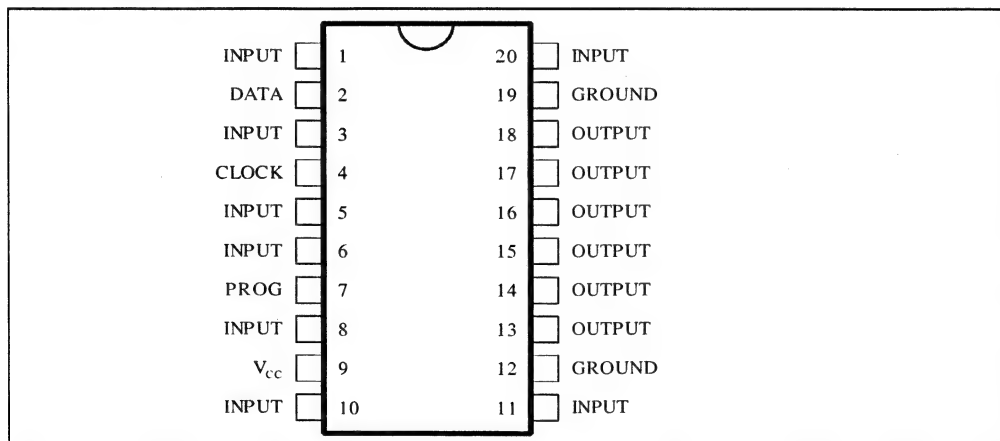
DIP20
(Plastic Package)

ORDER CODE : TEA6415C



SO20
(Plastic Micropackage)

ORDER CODE : TEA6415CD

PIN CONNECTIONS

6415C-01 EPS

Figure 9-17 TEA6415 Pin Layout TEA6415 (Switch)

9.8.2 Diagram C0, TDA8315T (IC7109)

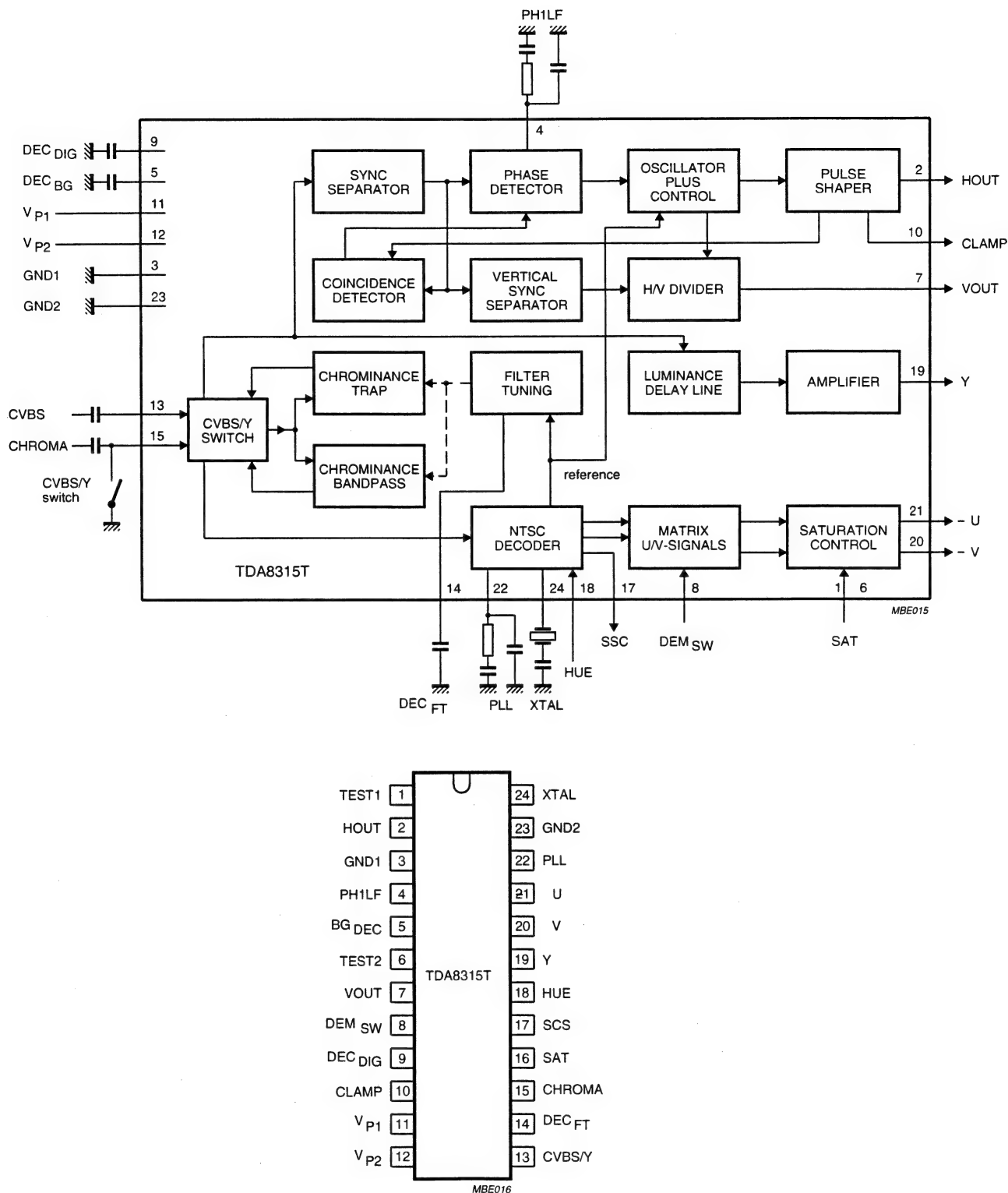


Figure 9-18 TDA8315T Internal Block Diagram and Pin Layout TDA8315T (NTSC Decoder)

9.8.3

Diagram L3, FALCONIC (IC7626)

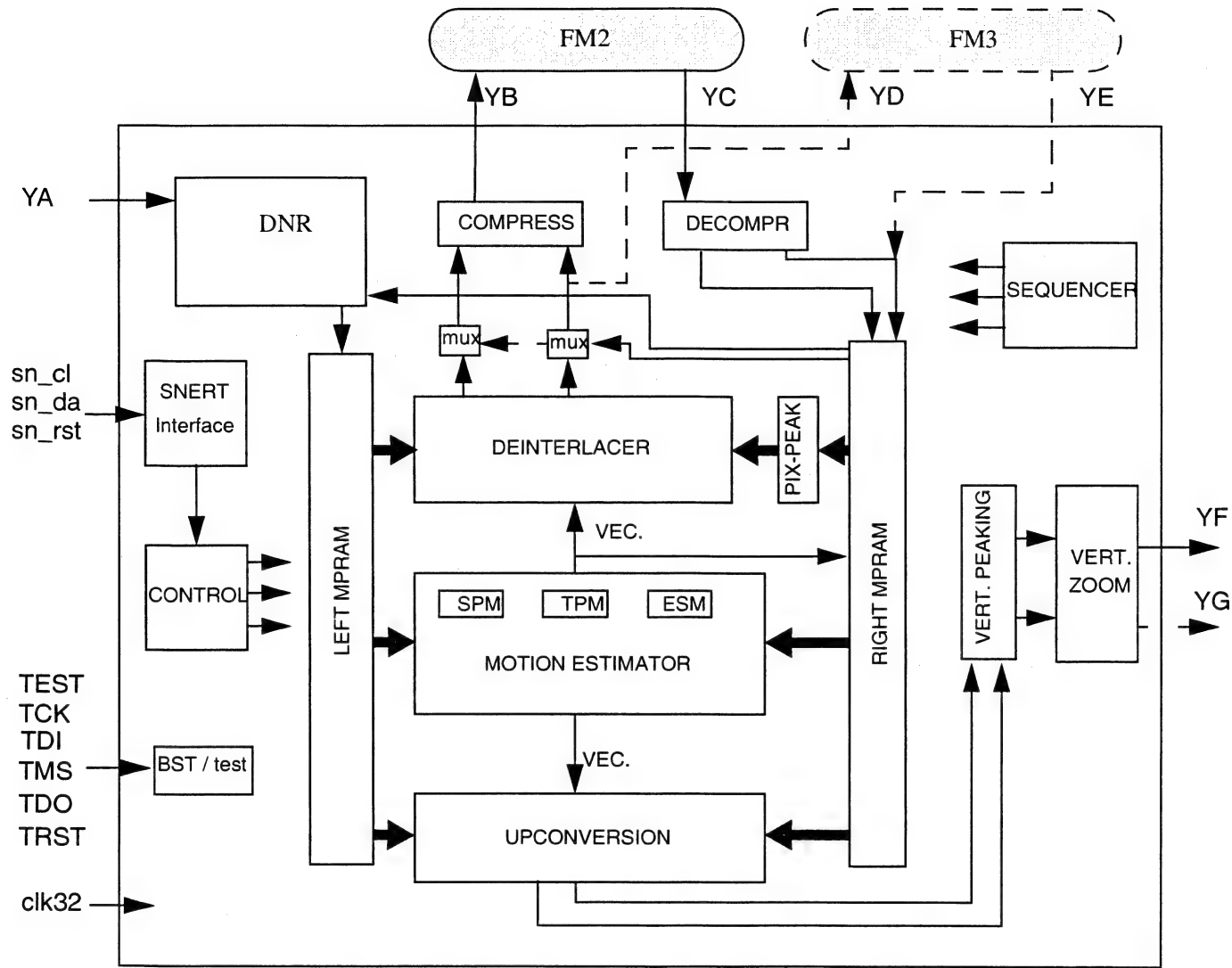


Figure 9-19 SAA4992 Internal Block Diagram SAA4992 (FALCONIC)

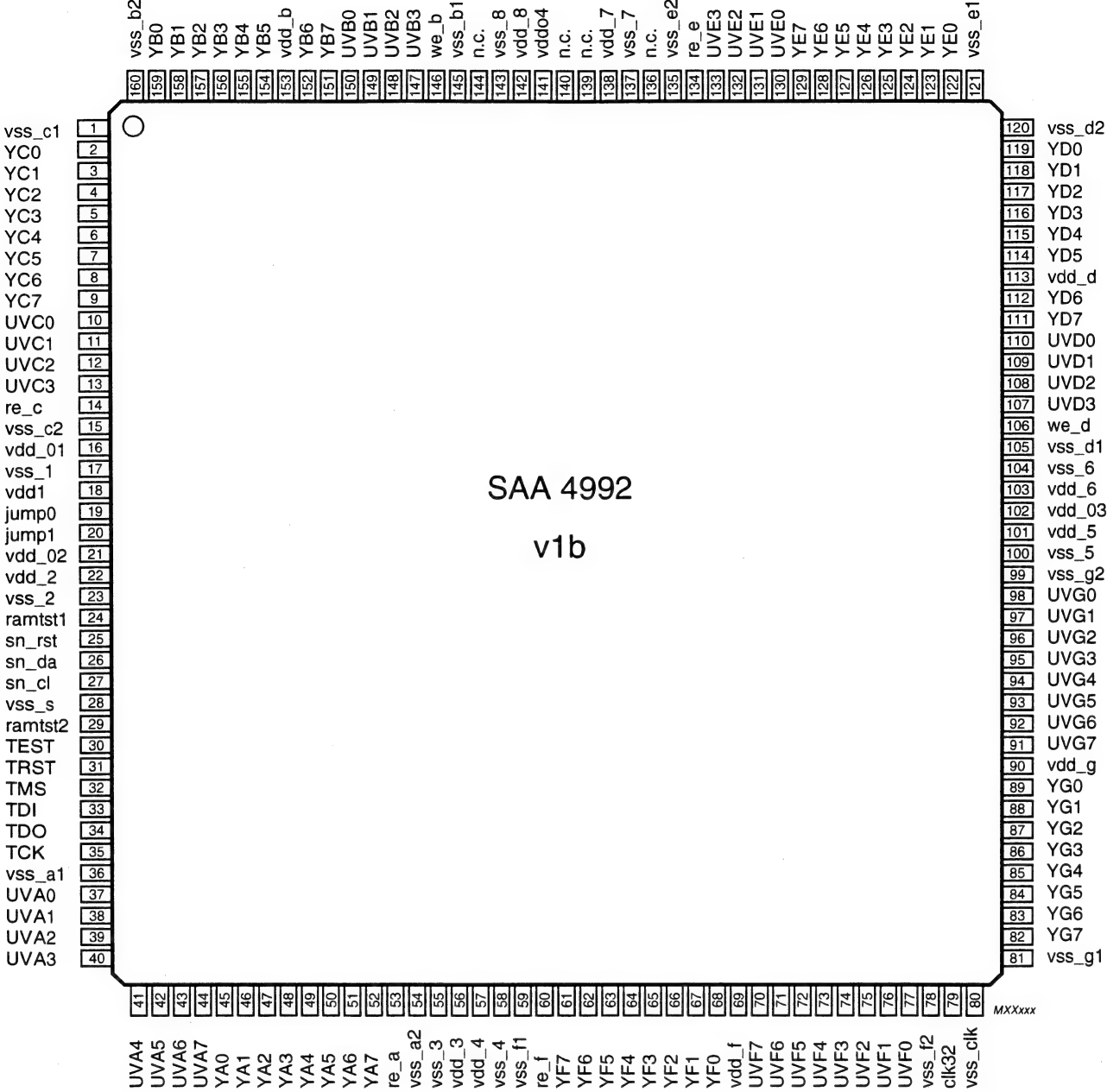
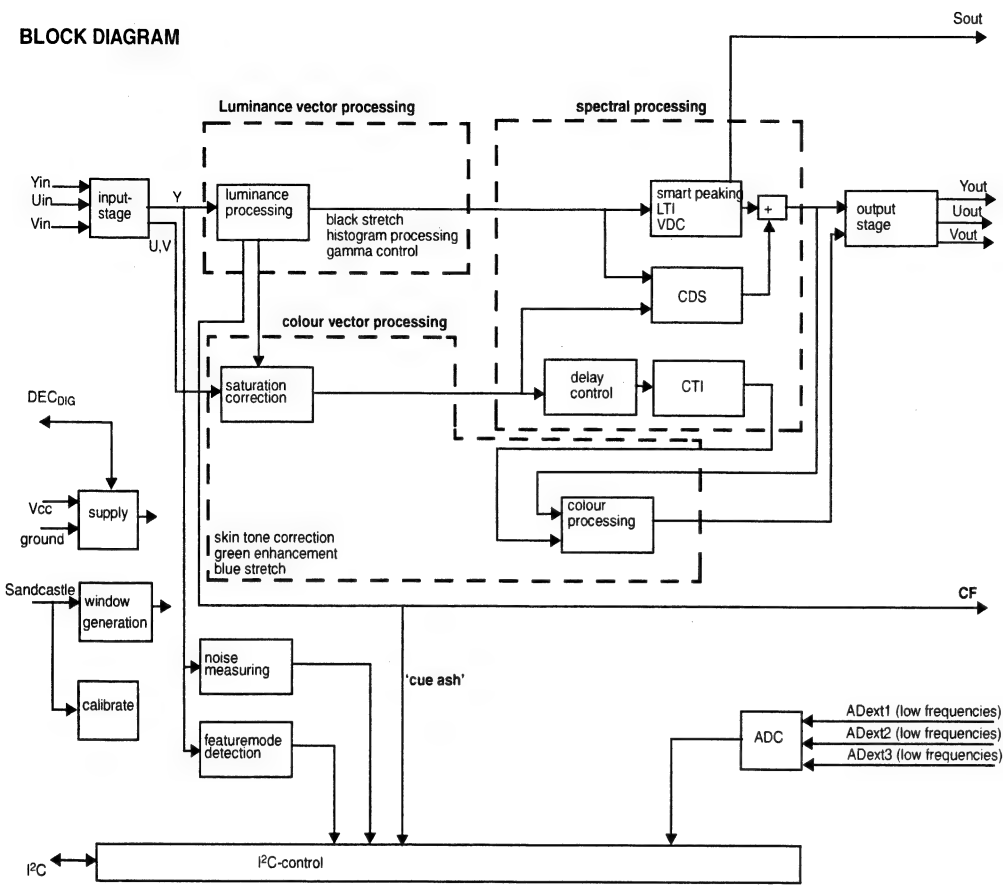


Figure 9-20 SAA4992 Pin Layout SAA4992 (FALCONIC)

9.8.4 Diagram K6, TOPIC (IC7402)



PINNING

SYMBOL	PIN	DESCRIPTION
SC	1	sandcastle input
NC	2	not connected
ADEXT1	3	ADC input 1
ADEXT2	4	ADC input 2
ADEXT3	5	ADC input 3
YIN	6	luminance input
ADR	7	address selection input
UIN	8	colour U input
VIN	9	colour V input
TP	10	test pin
SCL	11	serial clock input (I ² C-bus)
NC	12	not connected
NC	13	not connected
SDA	14	serial data input/output (I ² C-bus)
DEC _{DIG}	15	decoupling digital supply
VOUT	16	colour V output
UOUT	17	colour U output
V _{EE}	18	ground
YOUT	19	luminance output
V _{CC}	20	supply voltage
SOUT	21	scavem output
CF	22	cue ash output
NC	23	not connected
NC	24	not connected

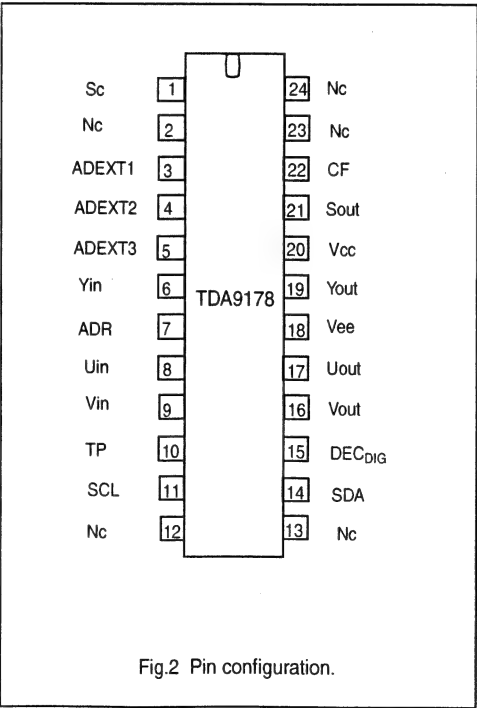


Fig.2 Pin configuration.

Figure 9-21 Internal Block Diagram and Pin Layout TDA9178 (TOPIC)

10. Spare Parts List

AV Interface [AV]

Various

0011	3122 121 67161	Earth sheet
0012	3122 121 67161	Earth sheet
0301	2422 025 16984	Connector 15P F
0302	2422 026 05248	Socket cinch 3P h Bk/Wh/Rd
0303	2422 025 16984	Connector 15P F
0304	4822 267 10962	Connector 11P m v 2.50 Wh
0305	4822 267 10962	Connector 11P m v 2.50 Wh
0306	4822 267 10974	Connector 9P m v 2.50 Wh
0307	4822 267 10962	Connector 11P m v 2.50 Wh
0308	4822 267 10962	Connector 11P m v 2.50 Wh
0309	4822 267 10979	Connector 9P m v 2.50 Bk
0310	4822 267 10962	Connector 9P m v 2.50 Rd
0313	2422 026 05247	Socket cinch 3P h Or/Wh/Rd
0315	4822 267 10979	Connector 9P m v 2.50 Bk
0328	4822 267 10981	Connector 11P m v 2.50 Bk
0333	4822 267 10962	Connector 11P m v 2.50 Wh
0340	4822 267 10974	Connector 9P m v 2.50 Wh
0341	4822 267 10974	Connector 9P m v 2.50 Wh
0355	4822 267 11043	Connector 3P m v 2.50 Ye
0371	2422 025 14904	Connector 7P m v 2.50 Wh
0372	4822 267 10979	Connector 9P m v 2.50 Bk
0373	4822 267 10978	Connector 7P m v 2.50 Bk
0398	4822 267 10962	Connector 11P m v 2.50 Wh
0399	4822 267 10962	Connector 11P m v 2.50 Wh
1513▲	4822 071 52001	Fuse T0.2A 250V TR5
1519	2422 025 16571	Connector 12P m v 2.54
8008	3104 311 02681	Cable 11P/220/11P Wh
8009	3104 311 03451	Cable 9P/220/9P Bk
8015	3104 311 03441	Cable 9P/60/9P Bk
8033	3104 311 02691	Cable 11P/280/11P Wh
8071	3104 311 02601	Cable 7P/60/7P Wh

—||—

2450	4822 126 14585	100nF 10% 50V
2460	4822 126 14585	100nF 10% 50V
2510	4822 124 12095	100µF 20% 16V
2511	4822 124 12095	100µF 20% 16V
2513	4822 124 12095	100µF 20% 16V
2514	4822 124 12095	100µF 20% 16V
2515	4822 126 14585	100nF 10% 50V
2519	5322 124 41945	22µF 20% 35V SMD
2520	4822 126 13482	470nF 80/20% 16V
2521	4822 126 14491	2.2µF -20+80% 10V 0805
2522	5322 122 32966	39pF 5% 50V
2523	4822 126 14491	2.2µF -20+80% 10V 0805
2524	4822 126 13693	56pF 1% 63V
2525	4822 126 14491	2.2µF -20+80% 10V 0805
2526	5322 122 32658	22pF 5% 50V
2527	4822 126 14491	2.2µF -20+80% 10V 0805
2528	5322 122 32966	39pF 5% 50V
2529	4822 126 14491	2.2µF -20+80% 10V 0805
2530	4822 126 13693	56pF 1% 63V
2531	4822 126 14491	2.2µF -20+80% 10V 0805
2532	5322 122 32658	22pF 5% 50V
2534	5322 122 32966	39pF 5% 50V
2536	4822 126 13693	56pF 1% 63V
2538	5322 122 32658	22pF 5% 50V
2542	4822 126 14585	100nF 10% 50V
2545	4822 126 14585	100nF 10% 50V
2546	4822 126 14491	2.2µF -20+80% 10V 0805
2550	4822 126 14585	100nF 10% 50V
2551	4822 124 12095	100µF 20% 16V
2570	4822 126 14585	100nF 10% 50V
2571	4822 126 14585	100nF 10% 50V
2575	4822 126 14585	100nF 10% 50V
2585	4822 126 14585	100nF 10% 50V
2587	5322 122 32268	470pF 5% 63V
2588	4822 122 33216	270pF 5% 50V
2601	5322 124 41945	22µF 20% 35V SMD
2607	4822 126 14585	100nF 10% 50V
2610	4822 126 14585	100nF 10% 50V
2622	5322 124 41945	22µF 20% 35V SMD
2642	5322 124 41945	22µF 20% 35V SMD
2655	4822 124 12095	100µF 20% 16V
2656	4822 126 14585	100nF 10% 50V
2665	4822 124 12095	100µF 20% 16V
2666	4822 126 14585	100nF 10% 50V
2707	4822 126 14076	220nF 25V. 20%
2708	4822 126 14076	220nF 25V. 20%
2710	4822 126 14585	100nF 10% 50V
2711	4822 126 14076	220nF 25V. 20%
2713	4822 126 14076	220nF 25V. 20%
2720	4822 126 14076	220nF 25V. 20%

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2721	4822 126 14076	220nF 25V. 20%
2724	4822 126 14076	220nF 25V. 20%
2725	4822 126 14076	220nF 25V. 20%
2727	5322 122 32269	6.8pF 5% 50V
2729	5322 122 32269	6.8pF 5% 50V
2740	4822 126 14585	100nF 10% 50V
2748	4822 124 23002	10µF 20% 16V
2761	4822 126 13482	470nF 80/20% 16V
2765	4822 126 13482	470nF 80/20% 16V
2801	5322 122 32531	100pF 5% 50V
2805	5322 122 32531	100pF 5% 50V
2810	5322 124 41945	22µF 20% 35V SMD
2811	4822 126 14585	100nF 10% 50V
2812	5322 124 41945	22µF 20% 35V SMD
2813	4822 124 23002	10µF 20% 16V
2814	4822 124 23002	10µF 20% 16V
2819	4822 124 23002	10µF 20% 16V
2820	4822 124 23002	10µF 20% 16V
2821	4822 124 23002	10µF 20% 16V
2826	4822 124 23002	10µF 20% 16V
2827	4822 124 23002	10µF 20% 16V
2829	4822 124 23002	10µF 20% 16V
2830	4822 124 23002	10µF 20% 16V
2832	4822 124 23002	10µF 20% 16V
2835	5322 122 31863	330pF 5% 63V
2840	4822 126 14585	100nF 10% 50V
2841	5322 124 41945	22µF 20% 35V SMD
2842	5322 124 41945	22µF 20% 35V SMD
2843	5322 124 41945	22µF 20% 35V SMD
2844	5322 124 41945	22µF 20% 35V SMD
2846	5322 122 31863	330pF 5% 63V
2849	5322 122 32531	100pF 5% 50V
2850	5322 124 41945	22µF 20% 35V SMD
2880	4822 126 14585	100nF 10% 50V
2883	4822 124 23002	10µF 20% 16V

3437	4822 051 20108	1Ω 5% 0.1W
3440	4822 117 11927	75Ω 1% 0.1W
3441	4822 117 11927	75Ω 1% 0.1W
3442	4822 117 11927	75Ω 1% 0.1W
3444	4822 117 11449	2k2 5% 0.1W 0805
3445	4822 117 11449	2k2 5% 0.1W 0805
3446	4822 117 11373	100Ω 1% 0805
3447	4822 117 11373	100Ω 1% 0805
3452	4822 117 10833	10k 1% 0.1W
3453	4822 117 10833	10k 1% 0.1W
3456	4822 117 10833	10k 1% 0.1W
3462	4822 117 10833	10k 1% 0.1W
3510▲	4822 052 10108	1Ω 5% 0.33W
3511▲	4822 052 10478	4Ω7 5% 0.33W
3512▲	4822 052 10108	1Ω 5% 0.33W
3519	4822 117 10833	10k 1% 0.1W
3520	4822 051 20822	8k2 5% 0.1W
3521	4822 051 20471	470Ω 5% 0.1W
3522	4822 051 20471	470Ω 5% 0.1W
3523	4822 117 11373	100Ω 1% 0805
3525	4822 051 20471	470Ω 5% 0.1W
3526	4822 051 20471	470Ω 5% 0.1W
3527	4822 117 11373	100Ω 1% 0805
3529	4822 051 20471	470Ω 5% 0.1W
3530	4822 051 20471	470Ω 5% 0.1W
3531	4822 117 11373	100Ω 1% 0805
3533	4822 051 10102	1k 2% 0.25W
3534	4822 051 10102	1k 2% 0.25W
3535	4822 051 10102	1k 2% 0.25W
3536	4822 117 10361	680Ω 1% 0.1W
3537	4822 117 10361	680Ω 1% 0.1W
3538	4822 117 10361	680Ω 1% 0.1W
3539	4822 051 20332	3k3 5% 0.1W
3540	4822 051 20472	4k7 5% 0.1W
3541	4822 117 10833	10k 1% 0.1W
3542	4822 117 10837	100k 1% 0.1W
3543	4822 117 10833	10k 1% 0.1W
3544	3198 021 52240	220k 5% 0805
3545	4822 051 20474	470k 5% 0.1W
3546	4822 051 10102	1k 2% 0.25W
3547	4822 117 10833	10k 1% 0.1W
3548	4822 117 10833	10k 1% 0.1W
3550	4822 051 10102	1k 2% 0.25W
3551	4822 051 10102	1k 2% 0.25W
3552	4822 051 10102	1k 2% 0.25W
3553	4822 051 20471	470Ω 5% 0.1W
3554	4822 051 20471	470Ω 5% 0.1W
3555	4822 051 20471	470Ω 5% 0.1W
3556	4822 051 10102	1k 2% 0.25W
3557	4822 051 10102	1k 2% 0.25W
3558	4822 051 10102	1k 2% 0.25W

3559	4822 117 11927	75Ω 1% 0.1W
3560	4822 117 11927	75Ω 1% 0.1W
3561	4822 117 11927	75Ω 1% 0.1W
3562	4822 117 11373	100Ω 1% 0805
3563	4822 117 11373	100Ω 1% 0805
3564	4822 117 11373	100Ω 1% 0805
3565	4822 051 20471	470Ω 5% 0.1W
3566	4822 051 20471	470Ω 5% 0.1W
3567	4822 051 20471	470Ω 5% 0.1W
3568	4822 051 20223	22k 5% 0.1W
3569	4822 117 10833	10k 1% 0.1W
3570	4822 051 10102	1k 2% 0.25W
3571	4822 117 10834	47k 1% 0.1W
3572	4822 117 10834	47k 1% 0.1W
3573	4822 117 10833	10k 1% 0.1W
3574	4822 051 20472	4k7 5% 0.1W
3575	4822 117 10833	10k 1% 0.1W
3576	4822 117 10834	47k 1% 0.1W
3577	4822 117 11507	6k8 1% 0.1W
3578	4822 117 11373	100Ω 1% 0805
3579	4822 117 11373	100Ω 1% 0805
3580	4822 117 11373	100Ω 1% 0805
3581	4822 117 10833	10k 1% 0.1W
3582	4822 117 11373	100Ω 1% 0805
3583	4822 117 11373	100Ω 1% 0805
3584	4822 116 83933	15k 1% 0.1W
3585	4822 117 10833	10k 1% 0.1W
3586	4822 051 20472	4k7 5% 0.1W
3587	4822 117 10833	10k 1% 0.1W
3588	4822 051 20273	27k 5% 0.1W
3589	4822 117 11449	2k2 5% 0.1W 0805
3590	4822 117 10833	10k 1% 0.1W
3591	4822 051 20108	1Ω 5% 0.1W
3592	4822 051 20472	4k7 5% 0.1W
3593	4822 051 10102	1k 2% 0.25W
3594	4822 051 20333	33k 5% 0.1W
3595	4822 051 20472	4k7 5% 0.1W
3596	4822 051 20472	4k7 5% 0.1W
3597	4822 117 11449	2k2 5% 0.1W 0805
3598	4822 051 20332	3k3 5% 0.1W
3599	4822 051 10102	1k 2% 0.25W
3602	4822 117 11373	100Ω 1% 0805
3603	4822 051 20223	22k 5% 0.1W
3605	4822 051 20561	560Ω 5% 0.1W
3606	4822 051 20122	1.2kΩ 5% 0.1W
3608	4822 051 20122	1.2kΩ 5% 0.1W
3609	4822 117 11454	820Ω 1% 0.1W
3610	4822 117 11454	820Ω 1% 0.1W
3615	4822 117 10833	10k 1% 0.1W
3622	4822 117 11373	100Ω 1% 0805
3623	4822 051 20223	22k 5% 0.1W
3625	4822 051 20561	560Ω 5% 0.1W
3626	4822 051 20332	3k3 5% 0.1W
3627	5322 117 12487	1k 1% 0.125W
3628	4822 117 11596	390Ω 1% 0.1W
3629	5322 117 12487	1k 1% 0.125W
3630	5322 117 12487	1k 1% 0.125W
3631	4822 051 20471	470Ω 5% 0.1W
3642	4822 117 11373	100Ω 1% 0805
3643	4822 051 20223	22k 5% 0.1W
3645	4822 051 20561	560Ω 5% 0.1W
3648	4822 117 11449	2k2 5% 0.1W 0805
3649	4822 051 20122	1.2kΩ 5% 0.1W
3650	4822 117 11449	2k2 5% 0.1W 0805
3651	4822 051 20122	1.2kΩ 5% 0.1W
3666	4822 051 20471	470Ω 5% 0.1W
3691	4822 051 20108	1Ω 5% 0.1W
3706	4822 051 20399	39Ω 5% 0.1W
3707	4822 117 11503	220Ω 1% 0.1W

3743	4822 051 20223	22k 5% 0.1W
3744	4822 117 10833	10k 1% 0.1W
3745	4822 117 10833	10k 1% 0.1W
3746	4822 117 10833	10k 1% 0.1W
3747	4822 117 11507	6k8 1% 0.1W
3748	4822 117 10834	47k 1% 0.1W
3749	4822 051 20474	470k 5% 0.1W
3750	4822 051 20472	4k7 5% 0.1W
3752	4822 051 20472	4k7 5% 0.1W
3754	4822 051 20229	22Ω 5% 0.1W
3755	4822 051 20229	22Ω 5% 0.1W
3756	4822 051 20229	22Ω 5% 0.1W
3757	4822 051 20229	22Ω 5% 0.1W
3760	4822 117 11449	2k2 5% 0.1W 0805
3761	4822 051 10102	1k 2% 0.25W
3762	4822 117 11449	2k2 5% 0.1W 0805
3763	4822 051 10102	1k 2% 0.25W
3764	4822 117 11449	2k2 5% 0.1W 0805
3765	4822 051 10102	1k 2% 0.25W
3766	4822 117 11449	2k2 5% 0.1W 0805
3767	4822 051 10102	1k 2% 0.25W
3768	4822 051 20822	8k2 5% 0.1W
3769	4822 051 20822	8k2 5% 0.1W
3773	4822 051 20108	1Ω 5% 0.1W
3800	4822 051 10102	1k 2% 0.25W
3801	4822 051 20332	3k3 5% 0.1W
3802	4822 117 10833	10k 1% 0.1W
3803	4822 051 20333	33k 5% 0.1W
3805	4822 051 10102	1k 2% 0.25W
3806	4822 051 20332	3k3 5% 0.1W
3807	4822 117 10833	10k 1% 0.1W
3808	4822 051 20333	33k 5% 0.1W
3822	4822 117 11373	100Ω 1% 0805
3824	4822 117 11373	100Ω 1% 0805
3835	4822 117 10833	10k 1% 0.1W
3836	4822 051 20154	150k 5% 0.1W
3837	4822 051 20333	33k 5% 0.1W
3841	3198 021 52240	220k 5% 0805
3842	3198 021 52240	220k 5% 0805
3843	4822 117 13577	330Ω 1% 0805 1.25W
3844	4822 117 13577	330Ω 1% 0805 1.25W
3845	4822 117 10353	150Ω 1% 0.1W
3846	3198 021 52240	220k 5% 0805
3847	4822 117 10353	150Ω 1% 0.1W
3848	3198 021 52240	220k 5% 0805
3849	4822 051 10102	1k 2% 0.25W
3850	4822 051 10102	1k 2% 0.25W
3851	4822 051 20333	33k 5% 0.1W
3852	4822 117 10834	47k 1% 0.1W
3854	4822 117 10834	47k 1% 0.1W
3861	4822 117 10833	10k 1% 0.1W
3862	4822 117 10834	47k 1% 0.1W
3865	4822 117 10834	47k 1% 0.1W
3867	4822 117 10837	100k 1% 0.1W
3868	4822 117 10837	100k 1% 0.1W
3869	4822 117 10837	100k 1% 0.1W
3870	4822 117 10837	100k 1% 0.1W
3875	4822 117 10834	47k 1% 0.1W
3876	4822 117 11373	100Ω 1% 0805
3880	4822 117 10833	10k 1% 0.1W
3881	4822 117 11373	100Ω 1% 0805
3882	4822 117 11373	100Ω 1% 0805
3883	4822 051 20474	470k 5% 0.1W
3894	4822 117 11449	2k2 5% 0.1W 0805
3895	4822 117 11449	2k2 5% 0.1W 0805
4408	4822 051 20008	Jumper 0805
4410	4822 051 20008	Jumper 0805
4412	4822 051 20008	Jumper 0805
4450	4822 051 20008	Jumper 0805
4451	4822 051 20008	Jumper 0805
4742	4822 051 20008	Jumper 0805

5450	4822 157 11074	Bead 600Ω at 100MHz
5513	4822 157 11074	Bead 600Ω at 100MHz
5520	4822 157 11074	Bead 600Ω at 100MHz
5523	3198 018 33980	3.9μH 10% 0805
5525	2422 535 94198	3.3μH 10% 0805
5529	3198 018 33980	3.9μH 10% 0805
5531	2422 535 94198	3.3μH 10% 0805
5535	3198 018 33980	3.9μH 10% 0805
5537	2422 535 94198	3.3μH 10% 0805
5545	4822 157 11074	Bead 600Ω at 100MHz
5550	4822 157 11074	Bead 600Ω at 100MHz
5570	4822 157 11074	Bead 600Ω at 100MHz
5575	4822 157 11074	Bead 600Ω at 100MHz
5585	4822 157 11074	Bead 600Ω at 100MHz
5610	4822 157 11074	Bead 600Ω at 100MHz
5655	4822 157 11074	Bead 600Ω at 100MHz
5710	4822 157 11074	Bead 600Ω at 100MHz
5740	4822 157 11074	Bead 600Ω at 100MHz
5810	4822 157 11074	Bead 600Ω at 100MHz

5840	4822 157 11074	Bead 600Ω at 100MHz
5880	4822 157 11074	Bead 600Ω at 100MHz



6440	9322 149 10685	BZM55-C33
6441	9322 149 10685	BZM55-C33
6442	9322 149 10685	BZM55-C33
6444	9322 149 10685	BZM55-C33
6445	9322 149 10685	BZM55-C33
6450	4822 130 11528	1PS76SB10
6513	4822 130 11528	1PS76SB10
6559	9322 149 10685	BZM55-C33
6560	9322 149 10685	BZM55-C33
6561	9322 149 10685	BZM55-C33
6570	4822 130 11528	1PS76SB10
6571	4822 130 11528	1PS76SB10
6578	9322 149 10685	BZM55-C33
6579	9322 149 10685	BZM55-C33
6580	9322 149 10685	BZM55-C33
6581	9322 149 10685	BZM55-C33
6582	9322 149 10685	BZM55-C33
6583	9322 149 10685	BZM55-C33
6584	9322 149 10685	BZM55-C33
6595	4822 130 11528	1PS76SB10
6666	4822 130 11397	BAS316
6667	9322 129 35685	BZM55-C4V7
6740	4822 130 11528	1PS76SB10
6741	4822 130 11397	BAS316
6748	4822 130 11397	BAS316
6801	9322 149 10685	BZM55-C33
6802	9322 149 10685	BZM55-C33
6805	9322 149 10685	BZM55-C33
6806	9322 149 10685	BZM55-C33
6835	4822 130 11397	BAS316
6845	9322 149 10685	BZM55-C33
6846	9322 149 10685	BZM55-C33
6847	9322 149 10685	BZM55-C33
6848	9322 149 10685	BZM55-C33
6849	9322 149 10685	BZM55-C33
6850	9322 149 10685	BZM55-C33
6862	4822 130 11397	BAS316
6867	4822 130 11397	BAS316
6868	4822 130 11397	BAS316
6869	4822 130 11397	BAS316
6870	4822 130 11397	BAS316
6875	4822 130 11397	BAS316
6876	9322 149 10685	BZM55-C33



7450	5322 209 11598	PC74HCT4538T
7453	5322 130 60159	BC846B
7460	4822 209 30212	PC74HCT125T
7520	4822 209 12776	TDAB601T/C1
7540	4822 209 73852	PMBT2369
7545	4822 209 71585	74HCT4538N
7546	4822 209 73852	PMBT2369
7550	9322 145 66668	TSH93ID
7568	5322 130 60159	BC846B
7570	5322 209 11598	PC74HCT4538T
7571	5322 130 60159	BC846B
7573	4822 209 73852	PMBT2369
7575	5322 209 71568	PC74HCT14T
7587	5322 130 60159	BC846B
7589	4822 209 73852	PMBT2369
7603	5322 130 60159	BC846B
7607	9322 145 66668	TSH93ID
7610	4822 209 60792	74HC4053D
7615	4822 130 61553	DTC124EU
7623	5322 130 60159	BC846B
7643	5322 130 60159	BC846B
7710	9322 105 08668	TEA6415CD
7740	5322 209 11598	PC74HCT4538T
7745	5322 130 60159	BC846B
7746	5322 130 60159	BC846B
7749	5322 130 60159	BC846B
7751	4822 130 61553	DTC124EU
7761	5322 130 60159	BC846B
7763	5322 130 60159	BC846B
7765	5322 130 60159	BC846B
7767	5322 130 60159	BC846B
7810	9322 116 87668	TEA6422D
7835	5322 130 60159	BC846B
7838	4822 130 61553	DTC124EU
7840	4822 209 60792	74HC4053D
7853	4822 130 61553	DTC124EU
7862	4822 130 60373	BC856B
7865	4822 130 60373	BC856B
7867	9340 547 13215	BSH103
7868	9340 547 13215	BSH103
7869	9340 547 13215	BSH103

7870	9340 547 13215	BSH103
7880	5322 209 33172	PCF8574AT
7881	5322 130 60159	BC846B
7884	4822 130 61553	DTC124EU

Front Panel [FP1]

Various

0011	3122 124 36091	Led holder
0012	3122 358 76351	Led holder IR
0301	4822 265 10838	Socket phono 1P f v 3.5mm
0302	4822 265 10643	Socket cinch Re
0303	4822 265 10642	Socket cinch Wh
0304	4822 265 10641	Socket cinch Ye
0305	2422 026 05256	Socket SVHS 4P f v
0308	2422 025 12494	Connector 11P m h 2.50
0309	2422 025 16688	Connector 9P m h 2.50
0344	4822 267 10748	Connector 3p m
1006	2422 128 02951	Switch 2P
1008	4822 276 13732	Tact switch
1010	4822 276 13732	Tact switch
1012	4822 276 13732	Tact switch
1014	4822 276 13732	Tact switch
1016	4822 276 13732	Tact switch



2005	5322 122 34098	10nF 10% 63V
2020	4822 124 41643	100μF 20% 16V
2025	4822 124 41643	100μF 20% 16V
2026	4822 124 41643	100μF 20% 16V
2040	4822 126 14076	220nF 25V. 20%
2048	4822 126 12105	33nF 5% 50V
2053	4822 124 40763	2.2μF 100V
2055	4822 126 14585	100nF 10% 50V
2056	4822 126 14585	100nF 10% 50V
2057	4822 126 14585	100nF 10% 50V
2057	5322 122 34098	10nF 10% 63V
2060	5322 122 31863	330pF 5% 63V
2061	5322 122 32531	100pF 5% 50V
2065	5322 122 31863	330pF 5% 63V
2066	5322 122 32531	100pF 5% 50V
2072	5322 122 34098	10nF 10% 63V
2075	5322 122 34098	10nF 10% 63V



3001	4822 051 20332	3k3 5% 0.1W
3002	2322 194 63109	10Ω 5% 2W
3003	2322 194 63109	10Ω 5% 2W
3008	4822 051 10102	1k 2% 0.25W
3009	4822 051 10102	1k 2% 0.25W
3010	4822 051 10102	1k 2% 0.25W
3011	4822 117 11373	100Ω 1% 0805
3012	4822 051 20471	470Ω 5% 0.1W
3013	4822 117 10353	150Ω 1% 0.1W
3014	4822 117 11373	100Ω 1% 0805
3015	4822 117 11373	100Ω 1% 0805
3016	4822 117 11504	270Ω 1% 0.1W
3017	4822 051 20121	120Ω 5% 0.1W
3020	4822 052 10108	1Ω 5% 0.33W
3025	4822 117 13577	330Ω 1% 0805 1.25W
3026	4822 117 13577	330Ω 1% 0805 1.25W
3027	4822 117 11507	6k8 1% 0.1W
3029	4822 051 20471	470Ω 5% 0.1W
3030	4822 051 20561	560Ω 5% 0.1W
3039	4822 117 11373	100Ω 1% 0805
3040	4822 051 20472	4k7 5% 0.1W
3041	4822 117 10833	10k 1% 0.1W
3042	4822 117 10833	10k 1% 0.1W
3044	4822 051 20332	3k3 5% 0.1W
3045	4822 051 20562	5k6 5% 0.1W 0805
3046	4822 051 20108	1Ω 5% 0.1W
3048	4822 051 20108	1Ω 5% 0.1W
3049	4822 051 20154	150k 5% 0.1W
3050	4822 051 20684	680k 5% 0.1W
3051	4822 051 20393	39k 5% 0.1W
3052	4822 051 20392	3k9 5% 0.1W
3053	4822 117 11449	2k2 5% 0.1W 0805
3055	4822 117 10837	100k 1% 0.1W
3057	4822 117 10833	10k 1% 0.1W
3058	4822 117 10834	47k 1% 0.1W
3060	4822 051 10102	1k 2% 0.25W
3061	4822 051 20333	33k 5% 0.1W
3062	4822 051 20332	3k3 5% 0.1W
3063	4822 117 10833	10k 1% 0.1W
3065	4822 051 10102	1k 2% 0.25W
3066	4822 051 20333	33k 5% 0.1W
3067	4822 051 20332	3k3 5% 0.1

3070	4822 051 20121	120Ω 5% 0,1W
3071	4822 051 20121	120Ω 5% 0,1W
3072	4822 117 10833	10k 1% 0.1W
3073	4822 051 20121	120Ω 5% 0,1W
3074	4822 051 20121	120Ω 5% 0,1W
3075	4822 117 10833	10k 1% 0.1W
3099	4822 117 10833	10k 1% 0.1W
4005	4822 051 20008	Jumper 0805
4006	4822 051 20008	Jumper 0805
4060	4822 051 20008	Jumper 0805
4061	4822 051 20008	Jumper 0805
4062	4822 051 20008	Jumper 0805
4063	4822 051 20008	Jumper 0805
4064	4822 051 20008	Jumper 0805



6001	9322 129 33685	BZM55-C3V3
6002	9322 127 27676	TSAL5300
6012	9322 155 82667	TSOP2236
6025	9322 155 82667	TSOP2236
6030	4822 209 72895	TLUV5320
6040	9322 149 10685	BZM55-C33
6041	9322 149 10685	BZM55-C33
6046	9322 149 10685	BZM55-C33
6047	9322 149 10685	BZM55-C33
6060	9322 149 10685	BZM55-C33
6061	9322 149 10685	BZM55-C33
6065	9322 149 10685	BZM55-C33
6066	9322 149 10685	BZM55-C33
6070	9322 149 10685	BZM55-C33
6071	9322 149 10685	BZM55-C33
6072	9322 149 10685	BZM55-C33
6073	9322 149 10685	BZM55-C33



7001	4822 130 41246	BC327-25
7044	4822 130 60511	BC847B
7044	5322 130 60159	BC846B
7050	4822 130 60511	BC847B
7051	4822 130 60373	BC856B
7052	4822 130 60373	BC856B
7055	9322 165 94668	TPS2014P

Small Signal Panel [K]

Various

0002	2422 486 80873	IC socket 42P DIL
0008	2422 486 80928	IC socket 8P DIL
0310	4822 267 10964	Connector 9P m v 2.50 Rd
0315	4822 267 10979	Connector 9P m v 2.50 Bk
0328	4822 267 10981	Connector 11P m v 2.50 Bk
0333	4822 267 10962	Connector 11P m v 2.50 Wh
0340	4822 267 10974	Connector 9P m v 2.50 Wh
0341	4822 267 10974	Connector 9P m v 2.50 Wh
0344	4822 267 10963	Connector 3P m v 2.50 Wh
0355	4822 267 11043	Connector 3P m v 2.50 Ye
0356	4822 267 10963	Connector 3P m v 2.50 Wh
0360	4822 267 10967	Connector 3P m v 2.50 Bk
0361	4822 267 10974	Connector 9P m v 2.50 Wh
0362	4822 267 10974	Connector 9P m v 2.50 Wh
0371	2422 025 14904	Connector 7P m v 2.50 Wh
0372	4822 267 10979	Connector 9P m v 2.50 Bk
0373	4822 267 10978	Connector 7P m v 2.50 Bk
1001	4822 242 10972	Crystal 6MHz
1101	3139 147 20221	Splitter PS1318/I
1102▲	3139 147 20181	Tuner UV1318S/A P-3
1105	4822 242 10688	Filter OFWK9456M
1107	4822 242 72211	Filter 5.5 MHz
1109	4822 242 81436	Filter OFWK3953M
1198	3104 301 08351	Cablephono-phonon 120mm
1200	2422 026 05254	Socket cinch 2P f h Wh/Rd
1201	4822 267 10771	Socket 2 x SCART
1202	4822 267 10771	Socket 2 x SCART
1305	5322 242 73686	Crystal 12 MHz
1525	4822 242 10695	Crystal 4.433 619 MHz
1528	4822 242 10697	Crystal 3.579 545 MHz
1751	4822 242 10434	Crystal 18.432 MHz
8010	3104 311 03781	Cable 9P/280/9P Rd
8040	3104 311 02621	Cable 9P/100/9P Wh
8061	3104 311 02621	Cable 9P/100/9P Wh
8062	3104 311 02621	Cable 9P/100/9P Wh
8072	3104 311 03441	Cable 9P/60/9P Bk



2001	4822 126 13482	470nF 80/20% 16V
2002	2238 586 59812	100nF +80/-20% 50V 0603

2003	2238 586 59812	100nF +80/-20% 50V 0603
2005	2238 586 59812	100nF +80/-20% 50V 0603
2006	2238 586 59812	100nF +80/-20% 50V 0603
2008	2238 586 59812	100nF +80/-20% 50V 0603
2009	2238 586 59812	100nF +80/-20% 50V 0603
2010	2238 586 59812	100nF +80/-20% 50V 0603
2011	2238 586 59812	100nF +80/-20% 50V 0603
2012	2238 586 59812	100nF +80/-20% 50V 0603
2013	4822 126 14076	220nF 25V. 20%
2014	4822 126 11669	27pF 5% 50V 0603
2015	4822 126 14585	100nF 10% 50V
2016	2238 861 18339	33pF 1% 50V
2021	4822 126 14585	100nF 10% 50V
2022	4822 126 14076	220nF 25V. 20%
2023	2238 586 59812	100nF +80/-20% 50V 0603
2024	5322 126 11578	1nF 10% 50V 0603
2025	2238 586 59812	100nF +80/-20% 50V 0603
2026	2238 586 59812	100nF +80/-20% 50V 0603
2027	2238 586 59812	100nF +80/-20% 50V 0603
2028	2238 586 59812	100nF +80/-20% 50V 0603
2029	4822 124 40433	47μF 20% 25V
2030	4822 124 40433	47μF 20% 25V
2031	2238 586 59812	100nF +80/-20% 50V 0603
2032	2238 586 59812	100nF +80/-20% 50V 0603
2035	4822 126 14585	100nF 10% 50V
2037	4822 126 14585	100nF 10% 50V
2038	4822 126 14585	100nF 10% 50V
2039	4822 126 13883	220pF 5% 50V
2040	4822 122 33177	10nF 20% 50V
2042	4822 126 11785	47pF 5% 50V 0603
2043	4822 126 11785	47pF 5% 50V 0603
2044	4822 126 11785	47pF 5% 50V 0603
2045	4822 124 41584	100μF 20% 10V
2046	4822 126 14585	100nF 10% 50V
2049	4822 126 14226	82pF 5% 50V 0603
2050	4822 126 14226	82pF 5% 50V 0603
2051	4822 126 14226	82pF 5% 50V 0603
2052	4822 126 14226	82pF 5% 50V 0603
2053	4822 126 14226	82pF 5% 50V 0603
2054	4822 126 14226	82pF 5% 50V 0603
2101	4822 124 40196	220μF 20% 16V
2102	4822 126 13473	220nF 80-20% 50V
2104	4822 122 33177	10nF 20% 50V
2105	4822 122 33177	10nF 20% 50V
2106	4822 122 33575	220pF 5% 63V
2107	4822 126 13694	68pF 1% 63V
2108	5322 122 31873	2.7pF 5% 100V
2109	4822 124 22652	2.2μF 20% 50V
2110	4822 124 21913	1μF 20% 63V
2111	4822 126 14585	100nF 10% 50V
2112	4822 122 33891	3.3nF 10% 63V
2116	4822 124 81044	470°F 20% 6.3V
2117	4822 126 13482	470nF 80/20% 16V
2118	5322 122 32967	5.6pF 10% 63V
2119	5322 122 31863	330pF 5% 63V
2120	4822 126 14076	220nF 25V. 20%
2121	4822 124 40248	10μF 20% 63V
2125	4822 122 33177	10nF 20% 50V
2126	4822 124 40433	47μF 20% 25V
2127	4822 126 14076	220nF 25V. 20%
2202	5322 122 31863	330pF 5% 63V
2203	5322 122 31863	330pF 5% 63V
2204	2238 586 59812	100nF +80/-20% 50V 0603
2205	4822 124 40248	10μF 20% 63V
2206	5322 122 32531	100pF 5% 50V
2209	5322 122 31863	330pF 5% 63V
2210	5322 122 32531	100pF 5% 50V
2212	4822 124 40248	10μF 20% 63V
2213	2238 586 59812	100nF +80/-20% 50V 0603
2215	5322 122 31863	330pF 5% 63V
2216	5322 122 31863	330pF 5% 63V
2217	5322 122 32531	100pF 5% 50V
2219	5322 122 31863	330pF 5% 63V
2220	5322 122 32531	100pF 5% 50V
2221	4822 126 14076	220nF 25V. 20%
2222	4822 124 81286	47μF 20% 16V
2224	5322 122 32531	100pF 5% 50V
2226	5322 122 32531	100pF 5% 50V
2228	5322 122 31863	330pF 5% 63V
2229	5322 122 31863	330pF 5% 63V
2240	5322 122 32531	100pF 5% 50V
2241	5322 122 32531	100pF 5% 50V
2242	4822 124 23002	10μF 20% 16V
2243	4822 126 14076	220nF 25V. 20%
2244	4822 126 14076	220nF 25V. 20%
2245	4822 126 14076	220nF 25V. 20%
2246	4822 126 14076	220nF 25V. 20%
2247	4822 126 14076	220nF 25V. 20%
2248	4822 126 14076	220nF 25V. 20%
2249	4822 126 14076	220nF 25V. 20%
2250	4822 126 14076	220nF 25V. 20%
2251	4822 124 80151	47μF 20% 16V
2252	4822 126 14076	220nF 25V. 20%
2253	4822 126 14076	220nF 25V. 20%

2254	4822 126 14076	220nF 25V. 20%
2255	4822 126 14076	220nF 25V. 20%
2256	4822 126 14076	220nF 25V. 20%
2257	4822 126 14076	220nF 25V. 20%
2258	4822 126 14076	220nF 25V. 20%
2259	4822 126 14076	220nF 25V. 20%
2300	4822 124 40196	220μF 20% 16V
2301	4822 126 14585	100nF 10% 50V
2302	4822 126 14585	100nF 10% 50V
2303	4822 124 22652	2.2μF 20% 50V
2304	2238 586 59812	100nF +80/-20% 50V 0603
2307	4822 122 33741	10pF 10% 50V
2308	4822 122 33741	10pF 10% 50V
2311	4822 124 40196	220μF 20% 16V
2312	2238 586 59812	100nF +80/-20% 50V 0603
2321	4822 126 13881	470pF 5% 50V
2322	4822 126 13881	470pF 5% 50V
2331	5322 126 11583	10nF 10% 50V 0603
2340	4822 126 13881	470pF 5% 50V
2343	2238 861 18109	10pF 1% 50V
2344	2238 586 59812	100nF +80/-20% 50V 0603
2351	2020 552 96326	220nF 10% 16V
2403	4822 126 14585	100nF 10% 50V
2404	4822 126 14585	100nF 10% 50V
2405	4822 126 14585	100nF 10% 50V
2406	2238 586 59812	100nF +80/-20% 50V 0603
2407	2238 586 59812	100nF +80/-20% 50V 0603
2408	2238 586 59812	100nF +80/-20% 50V 0603
2414	4822 051 30008	Jumper 0603
2415	4822 051 30008	Jumper 0603
2416	4822 051 30008	Jumper 0603
2417	2238 586 59812	100nF +80/-20% 50V 0603
2418	4822 124 40769	4.7μF 20% 100V
2419	5322 122 32654	63V 22nF 10%
2422	4822 124 22652	2.2μF 20% 50V
2423	4822 124 40769	4.7μF 20% 100V
2425	4822 122 33761	22pF 5% 50V
2427	5322 126 10511	1nF 5% 50V
2428	4822 126 11663	12pF 5% 50V 0603
2429	4822 126 11663	12pF 5% 50V 0603
2430	4822 122 33926	12pF 5% 50V 0805
2436	4822 124 80151	47μF 20% 16V
2501	2238 586 59812	100nF +80/-20% 50V 0603
2502	2238 586 59812	100nF +80/-20% 50V 0603
2503	2238 586 59812	100nF +80/-20% 50V 0603
2504	2238 586 59812	100nF +80/-20% 50V 0603
2505	2238 586 59812	100nF +80/-20% 50V 0603
2506	2238 586 59812	100nF +80/-20% 50V 0603
2507	2238 586 59812	100nF +80/-20% 50V 0603
2508	2238 586 59812	100nF +80/-20% 50V 0603
2509	2238 586 59812	100nF +80/-20% 50V 0603
2510	2238 586 59812	100nF +80/-20% 50V 0603
2511	2238 586 59812	100nF +80/-20% 50V 0603
2512	2238 586 59812	100nF +80/-20% 50V 0603
2520	2238 586 59812	100nF +80/-20% 50V 0603
2521	2238 586 59812	100nF +80/-20% 50V 0603
2522	5322 126 11579	3.3nF 10% 63V
2525	4822 126 14507	18pF 5% 50V 0603
2528	4822 122 33752	15pF 5% 50V
2532	4822 126 14043	1μF 20% 16V
2534	5322 126 10223	4.7nF 10% 63V
2535	4822 126 14491	2.2μF -20+80% 10V 0805
2536	4822 126 14585	100nF 10% 50V
2537	4822 126 14585	100nF 10% 50V
2538	4822 124 40433	47μF 20% 25V
2539	2238 586 59812	100nF +80/-20% 50V 0603
2540	4822 124 40433	47μF 20% 25V
2541	5322 122 32654	63V 22nF 10%
2545	2238 586 59812	100nF +80/-20% 50V 0603
2550	2238 586 59812	100nF +80/-20% 50V 0603
2553	4822 126 14585	100nF 10% 50V
2554	4822 126 14585	100nF 10% 50V
2555	2238 586 59812	100nF +80/-20% 50V 0603
2556	4822 126 14585	100nF 10% 50V
2557	2238 586 59812	100nF +80/-20% 50V 0603
2558	2238 586 59812	100nF +80/-20% 50V 0603
2560	2238 586 59812	100nF +80/-20% 50V 0603
2561	4822 124 81286	47μF 20% 16V
2562	2238 586 59812	100nF +80/-20% 50V 0603
2564	4822 122 33177	10nF 20% 50V
2567	5322 126 10733	680pF 5% 50V
2568	2020 552 94427	100pF 5% 50v 0603
2569	4822 122 33177	10nF 20% 50V
2570	2020 552 94427	100pF 5% 50v 0603
2572	2020 004 90283	10μF 20% 10V 1206
2751	2238 586 59812	100nF +80/-20% 50V 0603
2752	4822 126 13692	47pF 1% 63V
2753	4822 122 32927	220nF 20% 50V
2754	5322 122 32268	470pF 5% 63V
2755	5322 122 32268	470pF 5% 63V
2756	5322 122 32268	470pF 5% 63V
2757	5322 122 32268	470pF 5% 63V
2758	5322 122 32268	470pF 5% 63V
2759	5322 122 32268	470pF 5% 63V

2760	5322 122 32268	470pF 5% 63V	3042	4822 051 20474	470k 5% 0.1W	3236	4822 117 11927	75Ω 1% 0.1W
2761	4822 122 32927	220nF 20% 50V	3043	4822 051 30472	4k7 5% 0.062W	3239	4822 051 30102	1k 5% 0.062W
2762	4822 122 32927	220nF 20% 50V	3045	4822 051 20273	27k 5% 0.1W	3240	4822 117 11927	75Ω 1% 0.1W
2763	5322 122 32268	470pF 5% 63V	3047	4822 117 13525	24k 1% 0.62W 0603	3241	4822 117 10353	150Ω 1% 0.1W
2764	5322 122 32268	470pF 5% 63V	3048	4822 117 13526	150Ω 5% 0.63W	3242	4822 051 20822	8k2 5% 0.1W
2765	4822 124 12095	100μF 20% 16V	3059	4822 051 30681	680Ω 5% 0.062W	3243	4822 117 10353	150Ω 1% 0.1W
2766	4822 124 12095	100μF 20% 16V	3062	4822 117 12925	47k 1% 0.063W 0603	3244	4822 051 10102	1k 2% 0.25W
2767	5322 122 32286	3.3pF 5% 50V	3063	4822 051 30472	4k7 5% 0.062W	3245	4822 051 20392	3k9 5% 0.1W
2768	5322 122 32286	3.3pF 5% 50V	3066	4822 117 10833	10k 1% 0.1W	3246	4822 051 10102	1k 2% 0.25W
2769	4822 126 13482	470nF 80/20% 16V	3067	4822 051 30472	4k7 5% 0.062W	3248	4822 117 13577	330Ω 1% 0805 1.25W
2770	5322 126 11583	10nF 10% 50V 0603	3068	4822 051 30103	10k 5% 0.062W	3249	4822 117 12955	2k7 1% 0.1W 0805
2771	4822 122 33177	10nF 10% 63V	3069	4822 051 30689	68Ω 5% 0.063W 0603	3250	4822 117 11139	1k5 1% 0.1W
2772	4822 126 13956	68pF 5% 63V 0603	3070	4822 051 30103	10k 5% 0.062W	3251	4822 051 30102	1k 5% 0.062W
2773	5322 122 31647	1nF 10% 63V	3071	4822 051 30472	4k7 5% 0.062W	3252	2322 734 63309	33Ω 1% 0.1W 0805
2774	5322 122 31647	1nF 10% 63V	3072	4822 117 10834	47k 1% 0.1W	3253	4822 051 20391	390Ω 5% 0.1W
2775	4822 126 13482	470nF 80/20% 16V	3073	4822 051 20472	4k7 5% 0.1W	3254	4822 051 10102	1k 2% 0.25W
2776	4822 126 13956	68pF 5% 63V 0603	3074	4822 117 10837	100k 1% 0.1W	3255	4822 051 10102	1k 2% 0.25W
2777	4822 124 23002	10μF 20% 16V	3075	4822 051 30472	4k7 5% 0.062W	3256	4822 117 11927	75Ω 1% 0.1W
2778	4822 124 23002	10μF 20% 16V	3076	4822 051 30472	4k7 5% 0.062W	3257	4822 117 10353	150Ω 1% 0.1W
2779	4822 126 14585	100nF 10% 50V	3080	3198 031 11010	4 x 100Ω 5% 1206	3258	4822 117 10353	150Ω 1% 0.1W
2780	4822 124 23002	10μF 20% 16V	3090	3198 031 11010	4 x 100Ω 5% 1206	3259	4822 051 30273	27k 5% 0.062W
2781	4822 126 14585	100nF 10% 50V	3091	3198 031 11010	4 x 100Ω 5% 1206	3262	4822 117 12925	47k 1% 0.063W 0603
2782	4822 124 23002	10μF 20% 16V	3092	3198 031 11010	4 x 100Ω 5% 1206	3263	4822 051 30221	220Ω 5% 0.062W
2783	4822 126 13482	470nF 80/20% 16V	3093	3198 031 11010	4 x 100Ω 5% 1206	3264	4822 051 20822	8k2 5% 0.1W
2784	4822 126 13482	470nF 80/20% 16V	3094	3198 031 11010	4 x 100Ω 5% 1206	3265	4822 117 12955	2k7 1% 0.1W 0805
2785	5322 122 31647	1nF 10% 63V	3095	3198 031 11010	4 x 100Ω 5% 1206	3266	4822 117 10833	10k 1% 0.1W
2786	5322 122 31647	1nF 10% 63V	3096	3198 031 11010	4 x 100Ω 5% 1206	3267	4822 051 30102	1k 5% 0.062W
2787	5322 126 10223	4.7nF 10% 63V	3097	3198 031 11010	4 x 100Ω 5% 1206	3268	4822 051 30102	1k 5% 0.062W
2788	5322 126 10223	4.7nF 10% 63V	3098	3198 031 11010	4 x 100Ω 5% 1206	3269	4822 051 30561	560Ω 5% 0.062W
2790	4822 122 33761	22pF 5% 50V	3099	3198 031 11010	4 x 100Ω 5% 1206	3270	4822 051 10102	1k 2% 0.25W
2791	4822 122 33761	22pF 5% 50V	3102	4822 117 11449	2k2 5% 0.1W 0805	3271	4822 051 10102	1k 2% 0.25W
2792	5322 126 11583	10nF 10% 50V 0603	3103	4822 051 20008	Jumper 0805	3272	4822 117 10353	150Ω 1% 0.1W
2793	4822 122 33177	10nF 20% 50V	3104	4822 051 20008	Jumper 0805	3273	4822 051 20822	8k2 5% 0.1W
2801	4822 122 33761	22pF 5% 50V	3106	4822 051 20479	47Ω 5% 0.1W	3274	4822 117 12955	2k7 1% 0.1W 0805
2802	4822 124 12398	4.7μF 20% 25V	3110	4822 117 11449	2k2 5% 0.1W 0805	3275	4822 051 30339	33Ω 5% 0.062W
2803	4822 124 12398	4.7μF 20% 25V	3111	4822 117 11449	2k2 5% 0.1W 0805	3276	4822 051 30391	390Ω 5% 0.062W
2804	4822 122 32927	220nF 20% 50V	3112	4822 051 20472	4k7 5% 0.1W	3277	4822 051 30222	2k2 5% 0.062W
2805	4822 122 32927	220nF 20% 50V	3114	4822 051 20472	4k7 5% 0.1W	3278	4822 051 30331	330Ω 5% 0.062W
2808	4822 124 12095	100μF 20% 16V	3118	4822 051 20391	390Ω 5% 0.1W	3279	4822 051 30151	150Ω 5% 0.062W
2809	5322 126 10511	1nF 5% 50V	3119	4822 051 20479	47Ω 5% 0.1W	3281	4822 117 12903	1k8 1% 0.063W 0603
2810	5322 126 10511	1nF 5% 50V	3124	4822 051 30101	100Ω 5% 0.062W	3282	4822 117 13632	100k 1% 0603 0.62W
2811	5322 126 10511	1nF 5% 50V	3133	4822 117 12955	2k7 1% 0.1W 0805	3283	4822 051 30683	68k 5% 0.062W
2846	4822 124 23002	10μF 20% 16V	3135	4822 051 20472	4k7 5% 0.1W	3284	4822 117 13632	100k 1% 0603 0.62W
2847	4822 124 23002	10μF 20% 16V	3136	4822 117 11503	220Ω 1% 0.1W	3285	4822 051 30683	68k 5% 0.062W
2848	4822 124 23002	10μF 20% 16V	3137	4822 051 10102	1k 2% 0.25W	3286	4822 117 13632	100k 1% 0603 0.62W
2849	4822 124 23002	10μF 20% 16V	3138	4822 117 11448	180Ω 1% 0.1W	3287	4822 051 30683	68k 5% 0.062W
2852	4822 122 32927	220nF 20% 50V	3139	4822 117 11139	1k5 1% 0.1W	3288	4822 051 30101	100Ω 5% 0.062W
2853	4822 122 32927	220nF 20% 50V	3140	4822 117 12955	2k7 1% 0.1W 0805	3289	4822 051 30101	100Ω 5% 0.062W
2854	4822 122 32927	220nF 20% 50V	3141	4822 051 30562	5k6 5% 0.063W 0603	3290	4822 052 10478	4Ω 7 5% 0.33W
2855	4822 122 32927	220nF 20% 50V	3142	4822 051 30102	1k 5% 0.062W	3291	4822 051 30561	560Ω 5% 0.062W
2856	4822 122 32927	220nF 20% 50V	3143	4822 051 30102	1k 5% 0.062W	3292	4822 051 30103	10k 5% 0.062W
2857	4822 122 32927	220nF 20% 50V	3145	4822 051 30391	390Ω 5% 0.062W	3293	4822 051 30471	470Ω 5% 0.062W
2858	4822 122 32927	220nF 20% 50V	3146	4822 051 20223	22k 5% 0.1W	3294	4822 051 30103	10k 5% 0.062W
2859	4822 122 32927	220nF 20% 50V	3147	4822 052 10109	10Ω 5% 0.33W	3295	4822 051 30471	470Ω 5% 0.062W
2860	4822 122 32927	220nF 20% 50V	3152	4822 051 20471	470Ω 5% 0.1W	3296	4822 051 30103	10k 5% 0.062W
2861	4822 122 32927	220nF 20% 50V	3153	4822 051 10102	1k 2% 0.25W	3297	4822 051 30103	10k 5% 0.062W
2864	4822 124 81151	22μF 50V	3154	4822 117 11503	220Ω 1% 0.1W	3298	4822 117 13632	100k 1% 0603 0.62W
2867	4822 122 32927	220nF 20% 50V	3155	4822 117 11503	220Ω 1% 0.1W	3299	4822 051 30683	68k 5% 0.062W
2868	4822 122 32927	220nF 20% 50V	3200	4822 117 10353	150Ω 1% 0.1W	3300	4822 052 10688	6Ω 8 5% 0.33W
2869	4822 124 40196	220μF 20% 16V	3201	4822 117 10353	150Ω 1% 0.1W	3302	4822 051 30101	100Ω 5% 0.062W
2870	4822 122 32927	220nF 20% 50V	3202	4822 117 10353	150Ω 1% 0.1W	3303	4822 051 30101	100Ω 5% 0.062W
2871	4822 122 32927	220nF 20% 50V	3203	4822 117 10353	150Ω 1% 0.1W	3304	4822 051 30101	100Ω 5% 0.062W
2872	4822 124 40207	100μF 20% 25V	3204	4822 052 10688	6Ω 8 5% 0.33W	3307	4822 051 30102	1k 5% 0.062W
2873	5322 126 10511	1nF 5% 50V	3205	4822 051 20471	470Ω 5% 0.1W	3308	4822 051 30102	1k 5% 0.062W
2890	4822 122 33177	10nF 20% 50V	3206	4822 117 11927	75Ω 1% 0.1W	3309	4822 051 30333	33k 5% 0.062W
2891	4822 126 14585	100nF 10% 50V	3207	4822 051 20561	560Ω 5% 0.1W	3310	4822 051 20332	3k3 5% 0.1W
2897	2238 586 59812	100nF +80/-20% 50V 0603	3208	4822 051 20399	39Ω 5% 0.1W	3311	4822 051 30102	1k 5% 0.062W
-W-			3209	4822 117 11927	75Ω 1% 0.1W	3312	4822 117 13632	100k 1% 0603 0.62W
3001	2322 704 66201	620Ω 1% 0603	3210	4822 117 11927	75Ω 1% 0.1W	3317	4822 051 30102	1k 5% 0.062W
3003	3198 031 14710	4 x 470Ω 5% 1206	3211	4822 117 11927	75Ω 1% 0.1W	3318	4822 051 30102	1k 5% 0.062W
3004	3198 031 14710	4 x 470Ω 5% 1206	3212	2322 734 63609	36Ω 1% 0805	3321	4822 051 30102	1k 5% 0.062W
3005	3198 031 14710	4 x 470Ω 5% 1206	3213	4822 117 11927	75Ω 1% 0.1W	3322	4822 051 30102	1k 5% 0.062W
3006	4822 051 30103	10k 5% 0.062W	3214	4822 051 30102	1k 5% 0.062W	3323	4822 051 20393	39k 5% 0.1W
3007	5322 117 13053	6k8 1% 0.063W 0603	3215	4822 117 11927	75Ω 1% 0.1W	3324	4822 051 20274	270kΩ 5% 0.1W
3009	3198 031 14710	4 x 470Ω 5% 1206	3216	4822 051 20822	8k2 5% 0.1W	3325	4822 051 30102	1k 5% 0.062W
3010	5322 117 13042	3K9 1% 0.063W 0603	3217	4822 051 30102	1k 5% 0.062W	3326	4822 051 30221	220Ω 5% 0.062W
3011	4822 051 30472	4k7 5% 0.062W	3218	4822 051 20392	3k9 5% 0.1W	3330	4822 051 30684	680k 5% 0.062W
3023	3198 031 14710	4 x 470Ω 5% 1206	3219	4822 051 10102	1k 2% 0.25W	3331	4822 117 12925	47k 1% 0.063W 0603
3024	4822 051 30471	470Ω 5% 0.062W	3220	4822 051 10102	1k 2% 0.25W	3332	4822 051 30183	18k 5% 0.062W
3027	3198 031 14710	4 x 470Ω 5% 1206	3221	4822 117 10353	150Ω 1% 0.1W	3340	4822 051 30123	12k 5% 0.062W
3028	3198 031 14710	4 x 470Ω 5% 1206	3222	4822 117 10353	150Ω 1% 0.1W	3341	4822 051 10102	1k 2% 0.25W
3029	4822 051 30471	470Ω 5% 0.062W	3223	4822 117 10353	150Ω 1% 0.1W	3342	4822 051 30103	10k 5% 0.062W
3030	3198 031 11010	4 x 100Ω 5% 1206	3224	4822 117 10353	150Ω 1% 0.1W	3343	4822 117 10837	100k 1% 0.1W
3031	4822 117 13577	330Ω 1% 0805 1.25W	3225	4822 052 10688	6Ω 8 5% 0.33W	3344	4822 051 30103	10k 5% 0.062W
3032	4822 051 30471	470Ω 5% 0.062W	3226	4822 051 30102	1k 5% 0.062W	3350	4822 051 30474	470k 5% 0.062W
3033	4822 117 13523	220Ω 5% RESN 0.63W	3227	4822 051 20399	39Ω 5% 0.1W	3351	4822 117 12891	220k 1%
3034	4822 051 30103							



7001	9322 157 20668	MSM51V18165F-60J
7003	9352 684 81557	SAA5801H/015
7006	4822 130 60373	BC856B
7007	5322 130 60159	BC846B
7008	4822 209 16977	M24C32-WBN6
7009	4822 209 16978	LF33CV
7010	4822 209 73852	PMBT2369
7011	4822 130 11155	PDTC114ET
7012	3198 010 44010	PDTA114ET
7013	9322 149 03668	M29W400BT-90M1
7014	5322 130 60159	BC846B
7015	4822 130 60373	BC856B
7016	5322 130 60159	BC846B
7019	4822 130 10255	MUN2213
7103	5322 130 60159	BC846B
7104	5322 130 60159	BC846B
7107	4822 130 60373	BC856B
7111	5322 130 60159	BC846B
7112	5322 130 60159	BC846B
7113	4822 209 72042	L78L05ACZ
7200	4822 130 40959	BC547B
7201	4822 130 40959	BC547B
7203	4822 130 44568	BC557B
7204	5322 130 60159	BC846B
7205	5322 130 60159	BC846B
7206	5322 130 60159	BC846B
7207	4822 130 60373	BC856B
7208	9322 105 08668	TEA6415CD
7209	4822 209 12776	TDA8601T/C1
7216	5322 130 60159	BC846B
7300	9352 681 65518	TDA9330N3
7341	4822 130 60373	BC856B
7351	4822 130 60373	BC856B
7402	4822 209 17311	TDA9178T/N1
7418	4822 130 60373	BC856B
7419	4822 130 60373	BC856B
7420	4822 130 60373	BC856B
7424	4822 130 60373	BC856B
7501	9352 625 24518	TDA9321H/N2
7502	5322 130 60159	BC846B
7555	4822 130 60373	BC856B
7560	3122 357 20664	COMB 2D FTV
7561	5322 130 60159	BC846B
7751	9322 148 35668	MSP3410D-PS-C5
7752	5322 209 11102	HEF4052BT
7753	5322 209 11102	HEF4052BT
7756	4822 209 30095	LM833D
7757	9322 060 73668	MC33178DR2
7773	5322 130 60159	BC846B
7774	5322 130 60159	BC846B
7777	9322 116 87668	TEA6422D
7801	5322 130 60159	BC846B

Feature Box [L]

Various

0025	3104 301 23824	FBX-shield top
0026	3104 301 23834	FBX-shield botom
0361	4822 267 10974	Connector 9P m v 2.50 Wh
0362	4822 267 10974	Connector 9P m v 2.50 Wh
1701	4822 242 10685	Crystal 12MHz



2700	4822 126 14218	3.9pF 6% 50V 0603
2701	4822 126 14487	8.2pF 0.5% 50V 0603
2702	4822 126 11663	12pF 5% 50V 0603
2703	4822 126 14218	3.9pF 6% 50V 0603
2704	4822 126 11669	27pF 5% 50V 0603
2705	4822 126 11663	12pF 5% 50V 0603
2706	4822 126 14218	3.9pF 6% 50V 0603
2707	4822 126 11669	27pF 5% 50V 0603
2708	4822 126 11663	12pF 5% 50V 0603
2709	2238 586 59812	100nF +80/-20% 50V 0603
2710	4822 124 80791	470µF 20% 16V
2712	4822 126 13881	470pF 5% 50V
2713	4822 122 33761	22pF 5% 50V
2714	4822 122 33761	22pF 5% 50V
2715	2238 586 59812	100nF +80/-20% 50V 0603
2716	2238 586 59812	100nF +80/-20% 50V 0603
2717	4822 126 14043	1µF 20% 16V
2718	4822 122 33752	15pF 5% 50V
2719	4822 122 33752	15pF 5% 50V
2720	4822 122 33752	15pF 5% 50V
2721	2020 552 94427	100pF 5% 50v 0603
2722	2020 552 94427	100pF 5% 50v 0603
2723	4822 126 14225	56pF 5% 50V 0603

2724	4822 126 14225	56pF 5% 50V 0603
2725	4822 124 40248	10µF 20% 63V
2726	2238 586 59812	100nF +80/-20% 50V 0603
2727	4822 124 40255	100µF 20% 63V
2728	4822 124 40248	10µF 20% 63V
2729	2238 586 59812	100nF +80/-20% 50V 0603
2730	4822 124 40255	100µF 20% 63V
2731	4822 126 11785	47pF 5% 50V 0603
2732	4822 126 11785	47pF 5% 50V 0603
2733	4822 126 11785	47pF 5% 50V 0603
2734	4822 126 14507	18pF 5% 50V 0603
2735	4822 126 14507	18pF 5% 50V 0603
2736	4822 126 14507	18pF 5% 50V 0603
2737	4822 122 33753	150pF 5% 50V
2738	4822 122 33753	150pF 5% 50V
2739	4822 122 33753	150pF 5% 50V
2740	2238 916 15641	22nF 10% 25V 0603
2741	2238 916 15641	22nF 10% 25V 0603
2742	2238 916 15641	22nF 10% 25V 0603
2745	2238 586 59812	100nF +80/-20% 50V 0603
2746	2238 586 59812	100nF +80/-20% 50V 0603
2747	4822 124 40769	4.7µF 20% 100V
2748	2238 586 59812	100nF +80/-20% 50V 0603
2749	4822 124 40255	10µF 20% 63V
2750	2238 586 59812	100nF +80/-20% 50V 0603
2751	2238 586 59812	100nF +80/-20% 50V 0603
2752	2238 586 59812	100nF +80/-20% 50V 0603
2753	2238 586 59812	100nF +80/-20% 50V 0603
2754	4822 124 40769	4.7µF 20% 100V
2755	2238 586 59812	100nF +80/-20% 50V 0603
2756	2238 586 59812	100nF +80/-20% 50V 0603
2757	2238 916 15641	22nF 10% 25V 0603
2758	4822 126 14507	18pF 5% 50V 0603
2759	4822 126 14507	18pF 5% 50V 0603
2760	2238 586 59812	100nF +80/-20% 50V 0603
2761	2238 586 59812	100nF +80/-20% 50V 0603
2762	2238 586 59812	100nF +80/-20% 50V 0603
2763	2238 586 59812	100nF +80/-20% 50V 0603
2764	2238 586 59812	100nF +80/-20% 50V 0603
2765	2238 586 59812	100nF +80/-20% 50V 0603
2766	2238 586 59812	100nF +80/-20% 50V 0603
2767	2238 586 59812	100nF +80/-20% 50V 0603
2769	2238 586 59812	100nF +80/-20% 50V 0603
2773	2238 586 59812	100nF +80/-20% 50V 0603
2775	2238 586 59812	100nF +80/-20% 50V 0603
2777	2238 586 59812	100nF +80/-20% 50V 0603
2779	2238 586 59812	100nF +80/-20% 50V 0603
2781	2238 586 59812	100nF +80/-20% 50V 0603
2782	2238 586 59812	100nF +80/-20% 50V 0603
2783	2238 586 59812	100nF +80/-20% 50V 0603
2784	2238 586 59812	100nF +80/-20% 50V 0603
2785	2238 586 59812	100nF +80/-20% 50V 0603
2786	2238 586 59812	100nF +80/-20% 50V 0603
2787	2238 586 59812	100nF +80/-20% 50V 0603
2788	2238 586 59812	100nF +80/-20% 50V 0603
2789	2238 586 59812	100nF +80/-20% 50V 0603
2790	2238 586 59812	100nF +80/-20% 50V 0603
2791	2238 586 59812	100nF +80/-20% 50V 0603
2792	4822 124 40248	10µF 20% 63V
2793	2238 586 59812	100nF +80/-20% 50V 0603
2794	4822 124 40248	10µF 20% 63V
2795	2238 586 59812	100nF +80/-20% 50V 0603
2796	2238 586 59812	100nF +80/-20% 50V 0603
2797	2238 586 59812	100nF +80/-20% 50V 0603
2798	2238 586 59812	100nF +80/-20% 50V 0603
2799	2238 586 59812	100nF +80/-20% 50V 0603
2800	2238 586 59812	100nF +80/-20% 50V 0603
2801	2238 586 59812	100nF +80/-20% 50V 0603
2802	2238 586 59812	100nF +80/-20% 50V 0603
2803	2238 586 59812	100nF +80/-20% 50V 0603
2871	2238 586 59812	100nF +80/-20% 50V 0603
2872	2238 586 59812	100nF +80/-20% 50V 0603
2929	4822 126 13956	68pF 5% 63V 0603



3700	4822 051 30008	Jumper 0603
3701	4822 051 30008	Jumper 0603
3702	4822 051 30008	Jumper 0603
3706	4822 051 30391	390Ω 5% 0.062W
3707	4822 051 30391	390Ω 5% 0.062W
3708	4822 051 30391	390Ω 5% 0.062W
3709	4822 051 30101	100Ω 5% 0.062W
3710	4822 051 30101	100Ω 5% 0.062W
3711▲	4822 052 10109	10Ω 5% 0.33W
3713	4822 051 30008	Jumper 0603
3714	4822 051 30008	Jumper 0603
3715	4822 051 30008	Jumper 0603
3716	4822 117 13632	100k 1% 0603 0.62W
3717	4822 117 13632	100k 1% 0603 0.62W
3718	4822 117 13632	100k 1% 0603 0.62W
3719	4822 051 30221	220Ω 5% 0.062W
3720	4822 051 30221	220Ω 5% 0.062W

3721	4822 051 30221	220Ω 5% 0.062W
3722	4822 051 30681	680Ω 5% 0.062W
3723	4822 051 30681	680Ω 5% 0.062W
3724	4822 051 30681	680Ω 5% 0.062W
3725	4822 051 30332	3k3 5% 0.062W
3726	4822 117 11817	1k2 1% 1/16W
3727	4822 051 30151	150Ω 5% 0.062W
3728	4822 051 30151	150Ω 5% 0.062W
3729	4822 051 30689	68Ω 5% 0.063W 0603
3730	4822 051 30689	68Ω 5% 0.063W 0603
3731	4822 051 30472	4k7 5% 0.062W
3732	4822 051 30472	4k7 5% 0.062W
3733	4822 051 30472	4k7 5% 0.062W
3734	4822 051 30472	4k7 5% 0.062W
3740	4822 051 30221	220Ω 5% 0.062W
3741	4822 051 30221	220Ω 5% 0.062W
3742	4822 051 30221	220Ω 5% 0.062W
3752	4822 051 20108	1Ω 5% 0.1W
3753	4822 117 12917	1Ω 5% 0.062W 0603
3758	4822 051 30472	4k7 5% 0.062W
3759	4822 051 30221	220Ω 5% 0.062W
3760	4822 051 30105	1M 5% 0.062W
3763	4822 117 12139	22Ω 5% 0.062W
3764	4822 051 30109	10Ω 5% 0.062W
3773	4822 117 12925	47k 1% 0.063W 0603
3774	4822 117 12925	47k 1% 0.063W 0603
3781	4822 117 12925	47k 1% 0.063W 0603
3782	4822 117 12925	47k 1% 0.063W 0603
3783	4822 117 12925	47k 1% 0.063W 0603
3784	4822 051 30102	1k 5% 0.062W
3787	4822 051 30154	150k 5% 0.062W
3788	4822 117 12891	220k 1%
3789	4822 051 30472	4k7 5% 0.062W
3790	4822 051 30101	100Ω 5% 0.062W
3861	4822 051 30332	3k3 5% 0.062W
3862	4822 051 30103	10k 5% 0.062W
3863	4822 051 30681	680Ω 5% 0.062W
3864	4822 117 12925	47k 1% 0.063W 0603
3865	4822 051 30472	4k7 5% 0.062W
3870	4822 051 30008	Jumper 0603
3999	4822 051 30562	5k6 5% 0.063W 0603
4704	4822 051 30008	Jumper 0603
4707	4822 117 12662	4 x 10Ω 5%
4708	4822 117 12662	4 x 10Ω 5%
4709	4822 117 12662	4 x 10Ω 5%
4710	4822 117 12662	4 x 10Ω 5%
4711	4822 051 30008	Jumper 0603
4712	4822 051 30008	Jumper 0603
4713	2238 586 59812	100nF +80/-20% 50V 0603
4714	4822 051 30008	Jumper 0603
4715	2238 586 59812	100nF +80/-20% 50V 0603
4716	4822 051 30008	Jumper 0603
4717	4822 051 30008	Jumper 0603
4721	4822 051 30008	Jumper 0603
4722	2238 586 59812	100nF +80/-20% 50V 0603
4723	4822 051 30008	Jumper 0603
4724	2238 586 59812	100nF +80/-20% 50V 0603
4726	4822 051 30008	Jumper 0603
4731	4822 051 30008	Jumper 0603
4733	4822 051 30008	Jumper 0603
4735	4822 051 30008	Jumper 0603
4750	4822 051 30008	Jumper 0603
4753	4822 051 30008	Jumper 0603



7703	4822 209 73852	PMBT2369
7704	4822 209 73852	PMBT2369
7705	4822 209 17398	LD1117DT33
7706	9322 160 50668	LD1117DT25
7711	2422 486 80938	Socket 32p f
7712	5322 209 60424	74HC573D
7713	9352 688 09557	SAA4978H/V204 Y
7714	9965 000 02179	MS81V04160-25TB
7717	9322 183 81668	MSM54V12222B-25JS
7718	9352 695 58557	SAA4993H/V1
7719	9322 183 81668	MSM54V12222B-25JS
7727	5322 130 60159	BC846B
7741	4822 209 73852	PMBT2369

Power Supply [PS]**Various**

0005	3122 121 35811	Earth contact
0011	3122 421 60171	Spring
0300	2422 030 00304	Socket 2P m h mains
0306	4822 265 41391	Connector 9p m
0307	2422 025 12485	Connector 11p m
0320	4822 265 11253	Fuse holder 2p
1000	4822 252 60151	Sparkgap DSP-501N-A21F
1001	2422 086 10912	Fuse T2.5A 250V 5X20
1101	9965 000 07786	Fuse T4.0A 250V
1102	9965 000 07786	Fuse T4.0A 250V
1400	2422 132 07411	Relay 1P 5V 5A

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2000	4822 126 14153	2.2nF 10% 1kV
2001	2222 336 29147	330nF 20% 275V
2003	4822 126 14153	2.2nF 10% 1kV
2005	4822 124 12415	220µF 20% 400V
2006	3198 019 54710	470pF 10% 1kV
2007	3198 019 51520	1.5nF 10% 1kV
2008	4822 126 12263	220pF 10% 2kV
2009	5322 122 32531	100pF 5% 50V
2011	4822 124 80144	220µF 20% 25V
2012	4822 126 14585	100nF 10% 50V
2013	4822 126 13695	82pF 1% 63V
2014	5322 126 10511	1nF 5% 50V
2015	4822 122 33735	27nF 10% 63V
2016	5322 122 32531	100pF 5% 50V
2017	5322 122 34099	470pF 10% 63V
2018	4822 124 22652	2.2µF 20% 50V
2019	4822 126 14585	100nF 10% 50V
2020	4822 122 33127	2.2nF 10% 63V
2023	4822 126 14153	2.2nF 10% 1kV
2024	4822 126 14153	2.2nF 10% 1kV
2025	4822 124 41751	47µF 20% 50V
2030	4822 126 14208	220pF 20% 250V
2049	5322 126 10223	4.7nF 10% 63V
2050	5322 122 32531	100pF 5% 50V
2051	2020 554 90148	470pF 20% 250V
2052	3198 019 54710	470pF 10% 1kV
2053	4822 126 14208	220pF 20% 250V
2054	4822 126 14208	220pF 20% 250V
2101	4822 122 31211	100pF 10% 500V
2102	4822 121 43913	470nF 10% 100V
2103	4822 121 41673	220nF 10% 100V
2107	4822 126 13682	100pF 5% 1kV
2108	4822 124 40784	3300µF 20% 16V
2109	4822 124 81144	1000µF 16V
2110	4822 124 41751	47µF 20% 50V
2111	5322 122 32531	100pF 5% 50V
2112	4822 124 40784	3300µF 20% 16V
2113	4822 124 81144	1000µF 16V
2114	4822 124 80144	220µF 20% 25V
2115	4822 124 41751	47µF 20% 50V
2116	4822 126 14585	100nF 10% 50V
2117	4822 126 14585	100nF 10% 50V
2118	4822 126 14585	100nF 10% 50V
2119	4822 124 22726	4.7µF 20% 35V
2120	4822 126 14585	100nF 10% 50V
2121	4822 126 14585	100nF 10% 50V
2123	4822 126 14585	100nF 10% 50V
2124	4822 126 14585	100nF 10% 50V
2126	4822 126 14585	100nF 10% 50V
2127	4822 122 31211	100pF 10% 500V
2128	5322 122 32531	100pF 5% 50V
2129	4822 126 14585	100nF 10% 50V
2200	4822 126 14153	2.2nF 10% 1kV
2201	4822 126 14153	2.2nF 10% 1kV
2202	2222 151 90059	22µ 20% 400V
2203	4822 126 14208	220pF 20% 250V
2204	4822 126 14585	100nF 10% 50V
2205	5322 122 31647	1nF 10% 63V
2206	5322 122 32531	100pF 5% 50V

2207	4822 126 14525	47pF 5% 1kV
2310	5322 122 32531	100pF 5% 50V
2311	2020 021 91506	1000µF 20% 16V
2312	4822 126 14585	100nF 10% 50V
2313	4822 124 40196	220µF 20% 16V
2401	4822 126 14585	100nF 10% 50V

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3000	4822 053 21475	4M7 5% 0.5W
3001	4822 053 21475	4M7 5% 0.5W
3002	2322 595 90021	VDR 1mA/495V MAX 850V
3003	4822 053 21225	2M2 5% 0.5W
3005	2120 103 90057	100Ω 20% 0.5W
3010	4822 117 13473	22k 5% 2.5W
3011	4822 050 21003	10k 1% 0.6W
3012	4822 050 21008	1Ω 1% 0.6W
3013	4822 050 21008	1Ω 1% 0.6W
3014	4822 050 21008	1Ω 1% 0.6W
3015	4822 050 22208	2.2Ω 1% 0.6W
3016	4822 116 52186	22Ω 5% 0.5W
3017	4822 051 20472	4k7 5% 0.1W
3030	4822 117 11149	82k 1% 0.1W
3031	4822 117 10833	10k 1% 0.1W
3032	4822 051 20223	22k 5% 0.1W
3033	4822 116 83933	15k 1% 0.1W
3034	4822 116 83933	15k 1% 0.1W
3035	4822 117 10361	680Ω 1% 0.1W
3036	4822 116 83933	15k 1% 0.1W
3037	4822 051 20184	180k 5% 0.1W
3038	4822 117 13577	330Ω 1% 0805 1.25W
3039	4822 051 20223	22k 5% 0.1W
3040	4822 117 11504	270Ω 1% 0.1W
3041	4822 051 20182	1k8 5% 0.1W
3042	4822 050 23309	33Ω 1% 0.6W
3043	4822 050 21501	150Ω 1% 0.6W
3044	4822 051 20392	3k9 5% 0.1W
3101	4822 050 23302	3k3 1% 0.6W
3102	4822 050 23302	3k3 1% 0.6W
3104	4822 116 52283	4k7 5% 0.5W
3105	4822 116 52283	4k7 5% 0.5W
3106	4822 117 11373	100Ω 1% 0805
3107	4822 051 10102	1k 2% 0.25W
3108	4822 051 20392	3k9 5% 0.1W
3109	4822 116 52175	100Ω 5% 0.5W
3110	4822 117 10362	7k5 1% 0.1W
3111	2322 734 66803	68k 1% 0.1W 0805
3112	4822 117 11504	270Ω 1% 0.1W
3113	4822 117 11145	4k7 1% 0.1W
3114	4822 117 11953	560Ω 1% 0.1W
3200	4822 052 11108	1Ω 5% 0.5W
3310	4822 117 11373	100Ω 1% 0805
3311	4822 051 20471	470Ω 5% 0.1W
3312	4822 117 11145	4k7 1% 0.1W
3313	4822 117 11144	3k9 1% 0.1W
3314	4822 117 11448	180Ω 1% 0.1W
3401	4822 051 20223	22k 5% 0.1W
3402	4822 051 20223	22k 5% 0.1W
3403	4822 117 10833	10k 1% 0.1W
3999	4822 050 11002	1k 1% 0.4W

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5000	4822 157 53348	Mains filter CU15D3
5002	4822 526 10704	Bead 45Ω at 50MHz
5003	3128 138 39401	Transf. CT345D7
5004	4822 526 10704	Bead 45Ω at 50MHz
5005	4822 157 11411	Bead 83Ω at 100MHz
5102	3198 018 73380	3.3µH 20%
5103	3198 018 73380	3.3µH 20%
5104	3198 018 73380	3.3µH 20%
5200	3128 138 39411	Standby transformer
5201	4822 526 10704	Bead 45Ω at 50MHz
5202	4822 526 10704	Bead 45Ω at 50MHz
5300	4822 157 11411	Bead 83Ω at 100MHz
5301	4822 157 11411	Bead 83Ω at 100MHz

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6000	9322 132 55667	Bridge coil GBU4JL-7002
6002	4822 130 42606	BYD33J
6005	4822 130 31878	1N4003G
6006	4822 130 31878	1N4003G
6007	4822 130 42488	BYD33D
6009	4822 130 42488	BYD33D
6010	4822 130 42606	BYD33J
6011	4822 130 30621	1N4148
6012	4822 130 30621	1N4148
6014	4822 130 42606	BYD33J
6101	4822 130 42606	BYD33J
6103	4822 130 11572	STPS8H100F
6104	4822 130 42606	BYD33J

6105	4822 130 42606	BYD33J
6106	4822 130 81274	MBR745
6107	4822 130 42606	BYD33J
6108	4822 130 30621	1N4148
6109	4822 130 30621	1N4148
6110	4822 130 42606	BYD33J
6201	9336 018 60133	BZT03-C300
6202	9336 018 60133	BZT03-C300
6203	4822 130 31083	BYW55
6203	4822 130 80858	1N5062
6204	4822 130 31083	BYW55
6204	4822 130 80858	1N5062
6310	9322 161 76682	SB340L-7024
6401	4822 130 30621	1N4148
6402	4822 130 30621	1N4148



7000	9322 151 01687	STP6NC60FP
7001	4822 209 15684	MC44603AP
7002	9322 149 04682	TCET1102
7011	4822 209 16406	TL431ACD
7101	4822 130 60511	BC847B
7200	9322 037 99682	TNY256P
7202	4822 209 16406	TL431ACD
7203	9322 149 04682	TCET1102
7401	4822 130 42804	BC817-25
7402	4822 130 60511	BC847B

Standard Definition Panel [SD]**Various**

0022	3122 121 67161	Earth sheet
0023	3122 121 67161	Earth sheet
0304	2422 025 12494	Connector 11P m h 2.50
0305	2422 025 12494	Connector 11P m h 2.50
0360	2422 026 05252	Socket cinch 3P Rd/Bu/Gn
0361	2422 026 05253	Socket cinch 2P F Wh/Rd
0362	2422 026 05252	Socket cinch 3P Rd/Bu/Gn
0363	2422 026 05253	Socket cinch 2P F Wh/Rd

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2006	5322 122 32531	100pF 5% 50V
2010	5322 122 32531	100pF 5% 50V

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3002	4822 117 11927	75Ω 1% 0.1W
3003	4822 117 11927	75Ω 1% 0.1W
3004	4822 117 11927	75Ω 1% 0.1W
3005	4822 051 10102	1k 2% 0.25W
3006	4822 051 20332	3k3 5% 0.1W
3007	4822 051 20333	33k 5% 0.1W
3008	4822 117 10833	10k 1% 0.1W
3009	4822 051 10102	1k 2% 0.25W
3010	4822 051 20332	3k3 5% 0.1W
3011	4822 051 20333	33k 5% 0.1W
3012	4822 117 10833	10k 1% 0.1W
3999	4822 051 20333	33k 5% 0.1W

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6001	9322 149 10685	BZM55-C33
6002	9322 149 10685	BZM55-C33
6003	9322 149 10685	BZM55-C33
6004	9322 149 10685	BZM55-C33
6005	9322 149 10685	BZM55-C33
6006	9322 149 10685	BZM55-C33
6007	9322 149 10685	BZM55-C33
6008	9322 149 10685	BZM55-C33
6009	9322 149 10685	BZM55-C33
6010	9322 149 10685	BZM55-C33